Improving Infrastructure Delivery: Project Initiation Routemap
Asset Management Module
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Infrastructure and Projects Authority and Infrastructure Client Group

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Infrastructure shapes the way we live and is the foundation on which a successful economy is built. Transport links get us where we need to be, energy systems power our homes and businesses, and digital networks allow us to communicate. It is vital to improving our quality of life and integral to the creation of a vibrant economy.

The government is committed to delivering the high-quality infrastructure that the UK needs to build and sustain a more productive economy. To achieve this the government has committed to spend £100 billion on infrastructure this Parliament. This investment will create jobs and raise productivity.

To help realise the benefits from this investment the government created the Infrastructure and Projects Authority (IPA) as the government’s centre of expertise for project development and delivery. The IPA’s Cost Review and the NAO report on delivering major government projects identified the early stages of projects as a common source of failure on infrastructure projects. The original Project Initiation Routemap (Routemap) helped address these challenges and this update, which expands to include all construction projects and adds new modules, will enhance that work, helping provide the UK with the infrastructure it needs to thrive.

The Infrastructure Client Group demonstrates the value of effective collaboration between government and industry to support the development and exchange of best practice to improve delivery. Initially brought together by government to support the work of the Infrastructure Cost Review, the membership of this group is representative of the major infrastructure clients. It has been instrumental in setting a common agenda for change and supports a programme of activities and applied knowledge transfer across the public and private sectors. The success of this initiative has been made possible by the continued and valuable support from industry and academic partners.

Preface

Since the launch of the Routemap over 20 major projects across the transport, water, flood defence and energy sectors have undergone a Routemap assessment, helping to drive their successful delivery. Yet there is still work to do as projects continue to face challenges.

The recent NAO report on Delivering Major Projects in Government (2016) and the Infrastructure UK Cost Review (2010) both noted that projects continued to encounter problems in their early stages - and, particularly, that projects often publicly announced timelines and costs before plans have been properly tested. The report also identified a lack of project capability especially at portfolio level. The Routemap will help address these challenges by offering support on strategic decision making during project initiation based on the latest thinking and knowledge acquired from delivery of Major Projects applied in a series of structured exercises. It enables sponsors and those responsible for project delivery to properly align complexity with the necessary capabilities and other enhancements to ensure a more successful outcome.

The Project Initiation Routemap is a product of government working collaboratively with industry and the University of Leeds, through the Infrastructure Client Group.

Building on its success with economic infrastructure, the Routemap is being expanded to cover all construction projects and longer-term transformation projects as well. As part of this expansion two new modules are being added, for Risk Management and Asset Management alongside the existing topics on Requirements, Governance, Procurement, Execution Strategy and Organisational Design & Development. The new Risk Management Module covers the best practice in how to develop the project’s approach to risk management during the initiation phase. The Asset Management Module provides advice on how to structure and manage the interaction between the project team and the corporate asset management function to successfully deliver project outcomes.

Tony Meggs
Chief Executive of the Infrastructure & Projects Authority

Andy Mitchell
Chair of the Infrastructure Client Group

June 2016
Introduction: Align for Success - Asset Management

The Project Initiation Routemap (Routemap) is an aid to strategic decision-making. It supports the alignment of the sponsor and client capability to meet the degree of challenge during initiation and delivery of a project*. It provides an objective and structured approach to project initiation founded on a set of assessment tools.

The assessment tools help determine:
- The context and complexity of the delivery environment;
- The current and required sponsor, client, asset manager and market capability;
- Key considerations to enhance capability where complexity-capability gaps are identified.

The Routemap provides further diagnostics on addressing common capability gaps that typically need to be enhanced, such as blurred governance structures, or lack of alignment between benefits and requirements. These areas are explored in more depth in a number of Align for Success modules.

The purpose of each Align for Success module is to help:
- Gain a greater understanding of the complexity-capability results;
- Identify and analyse options to better align complexity-capability;
- Plan for successful achievement of desired outcomes;
- Assure enhancement plans during implementation.

Application of the Asset Management module helps to ensure that the project not only delivers working assets at handover into operations, but sustainable, longer term benefits and managed asset risks through the life of those assets.

*Throughout this guide the term project is used to mean both project or programme.
**Introduction:** Whether to use Align for Success – Asset Management

**Typical findings relating to Asset Management**

If the findings from your complexity-capability assessment identify any of the following issues (or similar ones) then Align for Success – Asset Management may help. Use the Considerations tables that follow to diagnose enhancements that may be required.

<table>
<thead>
<tr>
<th>Typical findings</th>
<th>Modules that help</th>
</tr>
</thead>
<tbody>
<tr>
<td>There is no clear lifecycle asset management strategy in the asset manager organisation articulated to sponsor or client</td>
<td><img src="icons.png" alt="Icons" /></td>
</tr>
<tr>
<td>There are no or inadequate lifecycle parameters – such as asset reliability, availability, cost of maintenance, or operability – defined in the requirements</td>
<td><img src="icons.png" alt="Icons" /></td>
</tr>
<tr>
<td>The project initiation and delivery focuses on processes to the detriment of outcomes and associated asset management goals</td>
<td><img src="icons.png" alt="Icons" /></td>
</tr>
<tr>
<td>There is no current requirement specified or plan and budget in place to develop lifecycle asset strategies, particularly for maintenance, asset information, and risk management, in the project before handover to operations and maintenance</td>
<td><img src="icons.png" alt="Icons" /></td>
</tr>
<tr>
<td>There is no clear role/dedicated resource on the project specifically tasked with providing the whole life asset knowledge and articulating the asset vision so as to optimise achievement of the organisational goals</td>
<td><img src="icons.png" alt="Icons" /></td>
</tr>
<tr>
<td>There is no strategic engagement with the operators and/or supply chain to ensure that the project solution is defined, developed, constructed and handed over appropriately</td>
<td><img src="icons.png" alt="Icons" /></td>
</tr>
<tr>
<td>There is limited use of Asset Information in developing project requirements and BIM is not built into project development activity.</td>
<td><img src="icons.png" alt="Icons" /></td>
</tr>
<tr>
<td>The project requirements, business case and design indicate a lack of future thinking and/or inadequate links to a corporate asset management strategy.</td>
<td><img src="icons.png" alt="Icons" /></td>
</tr>
<tr>
<td>The project has been assessed in isolation without reference to the business and asset management strategy.</td>
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</tr>
<tr>
<td>Poor decision-making, governance structures and processes undermine the integrated asset strategy</td>
<td><img src="icons.png" alt="Icons" /></td>
</tr>
<tr>
<td>Poor development and retention of Asset Management capability leads to inadequate asset management and, in turn, to less than optimum whole life value</td>
<td><img src="icons.png" alt="Icons" /></td>
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</tbody>
</table>

**Tip:**

This module should not be used in isolation. It is assumed you have already completed the Complexity-Capability Gap Analysis in the Project Initiation Routemap Handbook and have identified issues with Asset Management.

- Primary module for help
- Related module for help
Why Asset Management Matters
Why Asset Management Matters: What is Asset Management?

Intelligent Asset Management is the optimal lifecycle management of a system of physical assets to achieve the stated business objectives. It counters excessive focus on project (as opposed to benefit) delivery.

The purposes of applying good Asset Management to project delivery are to:
- ensure the project is focused on delivering the required long-term as well as immediate benefits
- consider the total cost of ownership as well as the benefits over the practical life of the assets
- ensure benefit realisation through integrating the capital and operational delivery benefits of the project back into the client’s asset system

Why is Asset Management important?
- Too often decisions are made during project initiation and delivery that lead to inadequate customer service or higher than anticipated operational and whole life cost, to assets that are not required or that never deliver what was required, or that pose unforeseen business risk.
- Only by explicitly addressing the question of what happens ‘after the project’ can organisations ensure they will really get what they need to realise the envisaged benefits.
- The benefits of good practice Asset Management have been shown to include:
  - optimised value for money
  - improved understanding of the whole asset life costs ('total cost of ownership') and value
  - clarity about the key lifecycle performance parameters, including asset availability, reliability, quality and operational requirements
  - enhanced business reputation
  - improved relationships with key stakeholders

Characteristics of effective Asset Management
- Effective Asset Management delivers the right assets and capability to meet requirements and achieve the benefits in the short, medium and long term. Experience shows that organisations are more likely to maximise the realisation of project benefits when there is:
  - clear ‘lifecycle’ and enabling strategies covering operations, maintenance, risk management, asset information, supply chain (operational as well as capital) and cost
  - investment designed to deliver best whole life asset management outcomes unconstrained by annualarity or capital/revenue settlement splits
  - integrated planning for handover to operations that considers the operational capability and information requirements as well as the operational impacts
  - confirmation of benefit delivery and capture of lessons learned through post-delivery review
- Emerging best practice also increasingly includes the equivalent of a dedicated ‘project asset manager’ role – someone with the skills and time to oversee the project from a longer term business perspective.

‘Asset Management is the provision, and maintenance, of the flow of services to customers at optimal whole life cost and value.’
Mark Worsfold, South West Water
The structure of the supporting materials in this module are designed to help you in embedding asset management at the centre of project outcomes to ensure that the project benefits are realised over the whole life of the asset not just upon project completion. It does this through providing tools, techniques and guidance on managing the interface between corporate asset management and the project team.
Considerations
Considerations

This section lists a series of questions that might be considered when validating an approach to Project Asset Management. Considering these questions helps the project team to form an effective asset management strategy and target areas for enhancement.

Prior to asking these question the output from the Routemap capability and complexity assessments should be reviewed for any factors relating to asset management.

Pillars of Asset Management

To successfully deliver the project outcomes the relationship between corporate asset management and the project team is key. The benefits to the business will only be realised through the combined capability of both client and asset manager. The structure of this module will guide sponsors and clients through the 3 pillars of asset management to reflect on and develop their approach to asset management.

To engage in effective asset management the sponsor and client need to understand the following:

- **Pillar 1 - Strategic Alignment and Outcomes**
  The asset management context within which the project is operating

- **Pillar 2 - Whole Life Value**
  How to optimise whole life value from the project outcomes

- **Pillar 3 - Performance and information**
  How to use asset performance and information to shape project development and delivery of outcomes
Considerations: Strategic Alignment & Outcomes

Any significant infrastructure project needs to be considered in the wider context of an effective asset management strategy based on an understanding of requirements and how the physical asset portfolio contributes to organisational goals and strategy.

<table>
<thead>
<tr>
<th>Key prompts</th>
<th>Considerations</th>
<th>What may help</th>
</tr>
</thead>
</table>
| **Asset Management Strategy** | ■ Is there a clear strategy for the overall asset portfolio and the associated resources, information and other enablers to develop and deliver this?  
■ Is there a forward looking, risk-based strategy based on an understanding of the relationships between assets and business outputs for example levels of service?  
■ Does the proposed project or programme fit within the asset management strategy and the corporate objectives?  
■ Has the optimum approach for the business case been derived and is it still appropriate? It may be a balance of operational and capital activities, including activities elsewhere in the portfolio.  
■ Is there an appropriate prioritisation mechanism for asset interventions linked to the organisation’s corporate goals?  
■ Is there appropriate and aligned decision-making (planning, capital and operational) that consistently considers the whole asset life and value? | [1] Asset Management and Anatomy v3  
HMT Green Book  
Supporting Material: The relationship of the project to the Asset Management Lifecycle |
| **Requirements & Objectives** | ■ Are the measures of success aligned with achievement of the corporate objectives and the target parameters including least whole life cost and optimum value?  
■ Do the requirements cover key operational parameters:  
   – Operability?  
   – Availability?  
   – Reliability?  
   – Maintainability?  
   – Decommissioning/disposal?  
   – Contingency plans/management? | Requirements Module  
Supporting material: Defining Asset Management requirements |
| **Capability** | ■ Are operations and maintenance staff involved appropriately in:  
   – designing the operability and maintainability of the assets?  
   – identifying and designing HAZOP and legal/regulatory requirements?  
   – maintaining services during construction?  
   – updating emergency response plans?  
   – capturing all the information about events the asset may experience - remodelling, a breach, formal inspection?  
   – planning the asset testing?  
■ Have the operational capacity and competence requirements been defined?  
■ Do the project plans include developing the required operational capacity and competence?  
■ Is there a defined role for a person to take the whole life business perspective on the project?  
■ Is there an adequate ‘person specification’ for this role, focusing not so much on their seniority in the organisation as their appropriate lifecycle skills and experience? | [8] The IAM Competences Framework Requirements  
Organisational Design and Development Module  
Support Material: Identifying Asset Management capability  
Support Material: The right capability at the right time.  
Governance Module |

Note: Further Guidance contains details and links for each document reference - Ref [8]
## Considerations: Whole Life Value

Understanding the total cost of ownership needs to start with a whole life cost/benefit analysis in advance of business case development. Both capital and operational costs should be considered in both policy and project requirements.

<table>
<thead>
<tr>
<th>Key prompts</th>
<th>Considerations</th>
<th>What may help</th>
</tr>
</thead>
</table>
| **Efficiency, Risk & Value** | ■ Have you assessed the potential technological development during the asset life?  
■ Do you have an appropriate method for assessing the balance of costs and benefits (value of risk mitigated) over the life of the assets?  
■ Have you considered the energy efficiency (for projected energy costs, CO2 - embedded & operational costs)?  
■ Have you considered any operational requirements for flexibility in asset use/performance?  
■ Have you considered other operational efficiency, such as labour, consumables, hired and contracted services?  
■ Have the asset resilience risks including external factors been evaluated?  
■ Does the risk strategy take account of asset interactions?  
■ Have any requirements for contingency and business continuity planning been considered?  
■ Is the supply chain strategy for operations as well as construction developed?  
■ Does it align with the asset management strategy and the service standards?  
■ Does the supply chain have the required asset management capability to optimise lifecycle performance?  
■ Does the supply chain strategy drive for continuous improvement in asset management? | PAS 2080 Carbon Management in Infrastructure  
Risk management module  
Procurement module  
Supporting material: Whole life risk and value planning |
| **Scenario Planning** | ■ Has the decision making taken account of data uncertainty, for example about current asset condition?  
■ Are alternative options generated and considered at every stage?  
■ Are there appropriate drivers for opex/capex decisions – for example, ‘no requirement for capital’ options are properly considered?  
■ Are options (both capital and operational) consistently assessed using the risk based cost/benefit methodology?  
■ Have you defined the projected asset life based on operational experience and requirements?  
■ Have you considered the accuracy of the data and of the decision-making tools?  
■ Have you considered the likely refurbishment or upgrade timescales and costs? | HMT Green book  
[7] BSI 15585 Life cycle costing  
Supporting material: Scenario Planning |
| **Funding** | ■ Is there a separation between the capital funding for the project and the future revenue/operational funding?  
■ If so are there conditions attached to each funding stream and how do these align to the asset management outcomes expected of the project? Is there a conflict of interest?  
■ What certainty is there that the future maintenance and operational phases of the project will be funded? How does this feature in the project scope and requirements?  
■ Does any split between capital and revenue funding cause resource/capability constraints to the project team?  
■ Did you have a split between capital and revenue funding cause resource/capability constraints to the project team either through direct recruitment or allocation of capability from within corporate asset management? | Supporting material: the relationship between funding and policy and the whole life value |

Note: Further Guidance contains details and links for each document reference - Ref [7]
**Considerations: Asset Performance and Information**

Life cycle enabling strategies, including operational, maintenance ongoing risk, supplier management and asset information management should be considered from project initiation to ensure realisation of project benefits upon completion with a smooth handover to the operations/maintenance phase of the project.

### Key prompts

<table>
<thead>
<tr>
<th>Data &amp; Information</th>
<th>Considerations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Are the asset unit costs captured so as to support asset management?</td>
<td></td>
</tr>
<tr>
<td>Are embedded carbon costs captured?</td>
<td></td>
</tr>
<tr>
<td>Have you captured all the operational costs: manpower, consumables including energy usage and costs, hired and contracted services?</td>
<td></td>
</tr>
</tbody>
</table>
| Have you captured all the maintenance costs:
  - Planned maintenance
  - Reactive maintenance
  - Strategic spares |
| Is there an existing asset information strategy for this project to fit with? |
| What asset information is required or generated during project (Project Information Model") that will be needed in operations? |
| What are the asset information strategy requirements beyond handover (the ‘Asset Information Model’)? |
| Is there a structured and managed process for providing the ‘as-built’ asset information in a timely manner in line with the BIM Standards? |
| Have operations / maintenance already been consulted on the information requirements including asset identification and asset layout? |
| If not, is there dedicated resource and funding to do this early in the project? |

<table>
<thead>
<tr>
<th>Performance</th>
<th>Considerations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Have you captured the probability of failure (reliability and its deterioration over time and/or usage) and the impact of failure?</td>
<td></td>
</tr>
<tr>
<td>Have you considered the asset’s resilience to low likelihood, high impact operational events?</td>
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<tr>
<td>Has the impact of failure on corporate objectives (loss of service, income, reputational damage etc.) been assessed?</td>
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<tr>
<td>Have social costs of failure been considered?</td>
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<tr>
<td>Have you assessed any potential disposal cost and timescale issues (especially for hazardous or polluting material)?</td>
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<tr>
<td>Has the future operational strategy already been defined?</td>
<td></td>
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<tr>
<td>Have any supporting change management and training requirements been identified?</td>
<td></td>
</tr>
<tr>
<td>Is there an existing maintenance strategy this project should fit with?</td>
<td></td>
</tr>
<tr>
<td>Are there dedicated resource and funding in the project to define optimal maintenance approaches and schedules?</td>
<td></td>
</tr>
<tr>
<td>What effective feedback mechanisms are there so as to improve future projects and asset decisions and asset planning more generally?</td>
<td></td>
</tr>
<tr>
<td>Are the asset operational cost models for the project built on actual operational data?</td>
<td></td>
</tr>
<tr>
<td>Is there structured monitoring of operational issues during the first year post project?</td>
<td></td>
</tr>
<tr>
<td>Is technical support provided to operations and maintenance for an appropriate period post-handover?</td>
<td></td>
</tr>
</tbody>
</table>

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**What may help**

- PAS 2080
- [4] BSI PAS 1192 Specification for information management
- Risk Management Module

**Supporting information:**

- Whole life risk and value planning.
- Execution Strategy Module.
Supporting Material
**Supporting Material: The relationship of the project to the Asset Management lifecycle**

A project is an intervention to either create or improve an existing asset base. Therefore in order to define and then successfully deliver the outcome expected from the project there is a need to first understand the context of the wider business Asset Management approach. Whilst recognising that there is no perfect model, the key considerations for project initiation and delivery are described in the diagram below.

- **Customers**
- **Legislation**
- **Investors**
- **Commercial Environment**

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**Tip:** Projects team will need the expertise of Asset Management professionals to adequately consider how a project contributes to lifecycle value. There is a recognised professional body through the Institute of Asset Management for recognising competence.
Supporting Material: The relationship between organisational context and whole life value

The organisational context within which a project is commissioned will hold significant influence over the success of delivering the asset management outcomes. Factors such as the funding model, policy decisions and any associated conditions of settlement imposed by sponsors can compromise achieving the asset management benefits.

To illustrate this point the case study below demonstrates how Scottish Power have a funding model which supports whole life asset management and enables them to align their project delivery to this. Scottish Power are a recognised industry leader in optimal management of physical assets having been the first power generator to be certified against the revised version of BSI Publicly Available Specification 55 (PAS 55-1:2008) following a stringent process of assessment which benchmarks best practice in asset management.

Scottish Power Example

- **Funding & Policy**: Maximising energy generation through minimising whole life costs
- **Goals, Visions & Values**: Optimising value for money across both capital and whole life investments
- **People & Culture**: Organisational design and development planned around whole life asset management
- **Technology**: Innovation incentivised for whole life asset value
- **Processes & Procedures**: Processes reflect whole life asset management decisions
- **Systems & Data**: Systems and data requirements invested to inform decision making over whole asset life

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**Tip:**
The critical corporate enablers to successful project asset management are:-
- Organisational design (same line management)
- Systems and processes considering whole life value
- A funding and policy environment which supports whole life asset management

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Private Company – funding determined by customers willingness to pay

Clear & transparent process for prioritising and quantifying asset investment in relation to whole life cost benefit

Detailed asset management plans setting out Asset Management Objectives e.g. As a priority ensuring safety for people and assets. Maximising production revenues and minimising OPEX ensuring a long term value for the assets.

Organisational structure which has operations and project delivery under the same line management responsibility, giving a single accountable director and flexibility to move resource

Strong focus on skills and competency management gathering internal know-how, alongside culture of supporting project delivery

Strategic workforce plan for Asset Management which considers project planning

Innovative technology explored looking for efficiencies. e.g. data analysis for decision making

Project prioritisation based on asset performance data, productivity, maintenance costs and design life.

Robust Opex calculation at financial investment decision e.g estimations commercially supported.

Joined up asset integrity plan and project planning resource requirements.

Using international comparators with assumptions and estimations made by O&M teams

Set up a handover process to ensure a smooth start of operations procedure for establishing deliverables (check lists, documents, commercial track records, spare parts)

Significant investment in asset data & information capture and systems:-
- Concept & modelling software to calculate logistics impact in business case (Rate failures, forecast analysis)
- Performance data (alarms & events, condition monitoring systems)
- Financial Data (internal O&M costs data base)
- Maintenance performance (power curves, stoppage causes & production issues)
Building on understanding the strategic context for the project, the complexity of the task can be assessed. In the Routemap we do this through applying the Delivery Environment Complexity Analytic (DECA). Determining the complexity will enable you to consider the capability required to deliver the project.

In Asset Management it is important to consider both the organisational and project team capability as the benefits will be derived long after the project has completed. A successful project delivers an asset which seamlessly integrates back into the corporate asset base, through a balance of the 3 factors understanding complexity, organisational capability and project team capability. If there is a gap identified understand which of the 3 factors needs to be adjusted to bring about alignment and successful delivery.

**Supporting Material: Identifying Asset Management Capability**

**DECA**

<table>
<thead>
<tr>
<th>FACTOR</th>
<th>PROFILE</th>
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</thead>
<tbody>
<tr>
<td>Strategic importance</td>
<td>H</td>
</tr>
<tr>
<td>Stakeholders/Influencers</td>
<td>H</td>
</tr>
<tr>
<td>Requirements and Benefit Articulation</td>
<td>M</td>
</tr>
<tr>
<td>Stability of overall context</td>
<td>H</td>
</tr>
<tr>
<td>Financial impact and value for money</td>
<td>H</td>
</tr>
<tr>
<td>Execution Complexity (including Technology)</td>
<td>M</td>
</tr>
<tr>
<td>Interfaces/Relationships</td>
<td>H</td>
</tr>
<tr>
<td>Range of disciplines &amp; skills</td>
<td>H</td>
</tr>
<tr>
<td>Dependencies</td>
<td>H</td>
</tr>
<tr>
<td>Extent of change</td>
<td>M</td>
</tr>
<tr>
<td>Organisational capability: performance to date</td>
<td>L</td>
</tr>
<tr>
<td>Interconnectedness</td>
<td>M</td>
</tr>
</tbody>
</table>

**Indicators:**
- ISO 9001 and 55001
- PAS 25
- Application of IAM Competencies Framework
- BIM Level 2 compliance
- P3M3

**Organisational Capability**

**Operability**

**Availability**

**Project Complexity**

**Competence**

**Project Team Capability**

**Indicators:**
- Review Project Asset Manager Job Description
- Consider Routemap Asset Manager Capability Assessment
**Supporting Material: The right capability at the right time**

Whilst aligning the complexity and project/organisation capabilities will set you up for success, the level of capability required by the project will fluctuate through its lifecycle. The diagram below demonstrates the most critical periods for strong Asset Management capability to support the project team along with a quick checklist for the Project Asset Manager Role.

A Project Asset Manager Role should be an integral part of to the project team throughout the lifecycle of the project, programme or delivery portfolio. The availability of a specific capability is key to ensuring that operational requirements are properly included at the start, because the project asset manager has an ongoing working relationship with operations; to supporting the development of lifecycle strategies, and ensuring not only the asset but as-built information and lifecycle strategies are handed over to operations; and in leading the post-delivery review.

**Example Project Asset Manager Role Description**

- Approval of specifications and designs for project to ensure that the end state product meets its objectives for maintainability and reliability.
- Development of project asset management policy in accordance with international standards and best practice so that project is managed in accordance with its whole life objectives from corporate asset management strategy.
- Development of maintenance standards, policies and procedures.
- Development of a inspection and maintenance policy identifying plant buy or hire solutions including business cases for capital expenditure and the subsequent design, development and procurement.
- Organisational development for the infrastructure management operation, including organisation design, competency development, recruitment and training of the infrastructure management team in time for commencement of commissioning.

"In my experience, effective sponsorship as the ‘project asset manager’ is fundamental to the successful delivery of major projects and programmes" – David Hughes, Director of Major Programme Sponsorship, London Underground
Supporting Material: How do we structure project governance to ensure asset management outcomes are protected?

The governance of a project team needs to balance the asset management capability (corporate and project team) and the complexity of the project. The three models set out below give different examples of how the relationship between a corporate asset management function and project team can be structured in order to deliver the asset management outcomes successfully.

**Option 1 - Ad-hoc Engagement**

- **Key Characteristics:**
  - Project of low complexity
  - Mature corporate asset management function
  - Minimal number of asset management stakeholders i.e. users/ operators/ maintainers

Project team develop and deliver project with ad-hoc input and advice from Corporate Asset Management Function, usually in the form of provision of technical standards for design, operation and asset data and information.

**Examples:** Regulated water sector minor works

**Option 2 - Seconded In**

- **Key Characteristics:**
  - Project of medium/high complexity
  - Mature corporate asset management function
  - Established relationships with asset management stakeholders e.g. users

Mature corporate asset management function second a project asset manager into the Project team. This enables appropriate input into the development and delivery of the project ensuring asset management outcomes are delivered and a smooth handover to operations upon project completion. In order for this model to work successfully the project asset manager needs to be given sufficient decision making accountability and time away from their day job in the corporate asset management function.

**Examples:** Regulated water sector major projects, Flood Risk Management Projects, Railway Enhancements

**Option 3 - Capability developed within Project**

- **Key Characteristics:**
  - Project of high complexity (innovative new technology)
  - Immature or absent (new asset) corporate asset management function
  - Multiple asset management stakeholders e.g. users/ operators/ maintainers with short term and long term objectives

The immature or absent corporate asset management function is not able to provide expertise into the project team. This could be because the asset type being created is completely new or the ultimate asset owner/operator cannot be identified at project inception. It is therefore the responsibility of the project team to bring in an appropriate project asset manager who will support project development and delivery. This capability will then transition (either in person or their knowledge) into the new corporate asset management function required to maintain and operate the asset upon completion.

**Examples:** Olympics Infrastructure Delivery, Crossrail
Supporting Material: Defining asset management requirements

The final aspect of defining the scope of the project upon completion of the capability/complexity gap analysis is to review the requirements and ensure the asset management deliverables are included at all levels. The example shown below demonstrates how the Olympic Delivery Authority incorporated their asset management sustainability ambitions into all levels of the programme requirements.

**London Olympics Committee of the Olympic Games (LOCOG) strategic approach to asset reuse**

<table>
<thead>
<tr>
<th>Stages</th>
<th>Key Documents</th>
<th>Key Actions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Policy</td>
<td>London 2012 Sustainability Policy and Plan</td>
<td>1. Implement policy</td>
</tr>
<tr>
<td>Technical and other implementation guidance</td>
<td>Policies and guidance documents (e.g. LOCOG Temporary guidance, etc)</td>
<td>3. Provide guidance and support on implementing the vision</td>
</tr>
<tr>
<td>Specify reuse strategy</td>
<td>LOCOG Asset Disposal Strategy</td>
<td>4. Develop a specific asset reuse strategy</td>
</tr>
<tr>
<td>Asset records management</td>
<td>A range of LOCOG Asset Disposal Lists</td>
<td>5. Engage with the market on the strategy, upskill suppliers, procure and collaborate</td>
</tr>
<tr>
<td>Lessons learned</td>
<td>Learning Legacy documentation</td>
<td>6. Collect, monitor, assess and manage asset data</td>
</tr>
</tbody>
</table>

**Tip:**
There are two types of Asset Management Requirements which can be defined within a project scope. The first is the Organisation Information Requirements (OIR) which translate the asset management strategy into a defined set of requirements. The second is Asset Information Requirements (AIR) which focus on the asset being built within the project and will be more specific in detail and build on the OIR.
“At Network Rail we have been developing and applying whole life cost methods and tools for over a decade. As a result of this work, our asset policies have greater consistency, stronger justification, and provide increased confidence that the required level of infrastructure performance will be delivered in a sustainable way at the lowest whole life, whole system cost” — Andy Kirwan, Network Rail
Supporting Material: Whole life risk and value planning

The inputs for scenario planning need to take the risk drivers and efficiency opportunities related to the different options and quantify them to enable comparison and evaluation of the most appropriate options to take place. The accuracy and value of this exercise is underpinned by the quality of the asset information available to the project team. There is a key role here for BIM both in ensuring robust asset information is available and in facilitating scenario planning. The very nature of whole life asset planning means it is has a significant impact on the cost drivers for project options when considered over the whole life of the investment.

It could be that other factors such as market capability, project team skills and innovation in design will impact more on the initial capital investment cost whereas in terms of whole life value for money understanding the asset management context and correctly using performance data will more likely drive project success. On this basis it is important to consider whole life cost/benefit including appropriate sensitivity analysis in project decision making.

Tip:
The HMT Green Book explicitly states the principle that Whole Life Cost analysis should be used to inform the economic and financial cases for the project. So for public sector projects being able to robustly demonstrate how whole life risk and value feeds into optioneering is essential.

“Risk & Value has become an integral part of how we make decisions in our investment programme over the last 2 regulatory periods. The challenge that it brings, along with the use of objective data, means that we can very easily apply the same robust and collaborative decision making process across everything from the introduction of a new software package through to building a major Water Treatment Works. It helped us to enable the 20% efficiency delivered through our last 5 year period so the results speak for themselves. This, as well as the fact that the whole process is built on such simple common sense principles, has enabled us to make this ‘the way we do things’”

– Emma Muir, Anglian Water
Supporting Material: Managing Asset interests in delivery

Over the lifecycle of the project, the ownership of the asset management benefits it delivers move from the corporate asset management function into the project team and then back again upon project completion and close. All of the mechanisms discussed in this module are designed to manage this transfer and protect the anticipated benefits until they are realised over the lifecycle of the asset.

Example:

During the development of the Olympic Stadium the Olympic Delivery Authority were tasked with delivering the asset management outcomes required for a successful games. A specific example of them taking ownership of the benefits during the project delivery phase was in the design decision around whether to include a roof on the Olympic Stadium. This was a decision to balance the short term games operation which preferred a roof in order to control wind speed more reliably against the whole life operational use of the stadium beyond the games themselves did not require a roof. The learning point here is that the project team were appropriately empowered and possessed adequate capability to determine the risks to make the decision not to include the roof, which resulted in the outcomes being achieved and value optimised.
Final Check
Final Check

*Will the proposed requirements:*

1. Covered the concerns identified by your core complexity-capability assessment? 

2. Covered gaps identified by answering the considerations in this module? 

3. An up-to-date portfolio position (capital and operational) confirming the requirement for the project? 

4. An appropriate decision-making methodology (including testing 'no investment' options), applied throughout the project lifecycle, to provide the optimum whole life cost and value solution? 

5. Identify a ‘project asset manager’ or equivalent to oversee the whole life requirements & the project relationship with operations on behalf of the asset manager and asset owning organisations, right through handover and to post-project review? 

6. Explicitly included budget and project resources for:
   - formal stage reviews of lifecycle parameters? 
   - development of operational, maintenance, risk management, cost and asset information strategies? 
   - handover deliverables other than the physical asset itself, including strategic spares, operational capability, O&M manuals and routines, and as-built information (asset, cost, risk, legal & regulatory)? 
   - post-project support 

**Tip:**
Build into the project plan the strategy for post-delivery review of opex and performance, including a formal review after some time of operations (e.g. 2 years)
Further Guidance
## Further Guidance

### Guidance

<table>
<thead>
<tr>
<th>Reference</th>
<th>Description</th>
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</table>

### Usage

<table>
<thead>
<tr>
<th>Reference</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>[1]</td>
<td>This document describes the 39 Subjects of Asset Management that are accepted as forming the whole body of knowledge regarding asset management.</td>
</tr>
<tr>
<td>[2]</td>
<td>New international standard on Asset Management that describes key elements of a competent asset management system, together with ISO 31000 on risk management.</td>
</tr>
<tr>
<td>[3]</td>
<td>PAS 1192-2:2013 provides a framework for the implementation of BIM level two during the design and construction stages of a project. Level 2 maturity focuses specifically on project delivery, where the majority of graphical data, non-graphical data and documents known collectively as the project information model (PIM), are accumulated from design and construction activities.</td>
</tr>
<tr>
<td>[4]</td>
<td>PAS 1192-3:2014 provides a framework for the ongoing management of information during the operational life of an asset. The document provides an approach to creating an asset information model to support the whole life of an asset from acquire, through operate/maintain and on to dispose.</td>
</tr>
<tr>
<td>[5]</td>
<td>PAS 1192-4:2014 centres on the collaborative production of information, fulfilling employers information exchange requirements using Construction Operations Building Information Exchange (COBie). COBie is a data format for the publication of a subset of building model information focused on delivering building information not geometric modelling. Organisations should review COBie’s applicability to their information needs.</td>
</tr>
<tr>
<td>[6]</td>
<td>Government Soft Landings (GSL) is an initiative which aims to improve briefing, design, handover and building performance through enhancing understanding of the user requirements. Include GSL standard.</td>
</tr>
<tr>
<td>[7]</td>
<td>ISO 15686 deals with service life planning and should be used at the project initiation, feasibility and design stages. It currently covers the cost aspect but consideration is being given to extending it to also cover the ‘value’ aspect of service life so as to provide a full sustainability lifecycle cost and value view.</td>
</tr>
<tr>
<td>[8]</td>
<td>The IAM Competences Framework sets out a high-level view of skills and experience required for key asset management roles.</td>
</tr>
<tr>
<td>[9]</td>
<td>This European standard addresses all railway applications and stakeholders (operators, suppliers, regulators). It defines a systematic, risk-oriented process toward specification and verification of RAMS requirements.</td>
</tr>
<tr>
<td>[10]</td>
<td>Systems engineering is aimed at all stages in the project lifecycle, to ensure business needs are translated into design, construction and the final asset. This example handbook covers the complete systems engineering life cycle including reliability, availability and maintainability.</td>
</tr>
</tbody>
</table>
Glossary
Asset Manager
The asset manager is the organisation (or parts of it) that is responsible for day-to-day operations and maintenance of the asset once it is delivered. The asset manager may be a part of the sponsor and/or client organisations or a separate entity. Similarly the operator and maintainer may be separate entities.

Asset Management
‘Asset Management’ is the co-ordinated activity of organisations to realise value from their physical assets. The aim is the optimal management of the assets throughout their lifecycle to deliver organisational objectives now and into the future, and so is clearly of major concern to both sponsor and asset manager. The challenge is to ensure lifecycle considerations are also made a concern for the client.

Client
The client is the organisation that is responsible for fulfilling the project requirements and delivering the benefits. The client translates the requirements from the sponsor and manages the delivery outcomes, which naturally includes delivery of the asset/s to the asset manager.

Portfolio
The collection of assets, asset systems and associated projects and activities managed by the asset management organisation.

Project
Throughout this guide the term project is used to mean both project and programme.

Project asset manager
A new role identified by some asset manager organisations to ensure lifecycle requirements are fully considered at every stage of a project, from requirements to handover. They may or may not be a sponsor, or work for the sponsor organisation; they will have strong links to the asset manager organisation.

RAMS (Reliability, Availability, Maintainability, Safety)
RAMS stands for Reliability, Availability, Maintainability and Safety. These four properties are important lifecycle attributes of assets.

- Reliability denotes an asset or system’s ability to perform the required function, and is the inverse of its probability of failure
- Availability refers to an asset or system being available to carry out its required function when required, and is a function of both reliability and maintainability
- Maintainability is determined by the ease or speed with which an asset or system can be maintained or repaired
- Safety denotes the risk for harming people, in particular, but also the environment or other assets

Sponsor
The sponsor owns the business case and is responsible for specifying the requirements to the client. In most cases the sponsor also secures the funding. As owner of the business case, the sponsor is responsible for ensuring strategic alignment of the project and achieving the optimum whole life value.

Whole Life Costs
Whole life costs refers to the ‘total cost of ownership’ of an asset or asset system, and this includes asset creation (purchase price, installation, design, construction), operations, maintenance, refurbishment and disposal costs. It also includes the consequential cost of asset failure, in other words how much the asset costs when it does not function as required. This itself is the inverse of the benefit to the owner when it does function.
We are pleased to see UK Government taking the lead in this field. This is key to the future wealth of the UK, and Institute of Asset Management (IAM) is delighted to recommend this approach and commit to developing good practice and further guidance in this area.” David McKeown, CEO, Institute of Asset Management

IPA would like to thank the following organisations that contributed time and expertise to the development of the Routemap.

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- Environment Agency
- The Institute of Asset Management
- +amcl

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