



**International
Standard**

ISO 6082

**Construction project governance —
Guidance on delivery management**

**First edition
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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO document should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

ISO draws attention to the possibility that the implementation of this document may involve the use of (a) patent(s). ISO takes no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document, ISO had not received notice of (a) patent(s) which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at www.iso.org/patents. ISO shall not be held responsible for identifying any or all such patent rights.

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 59, *Buildings and civil engineering works*, Subcommittee SC 18, *Construction procurement*.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

The way clients approach procurement has a major influence on how the industry behaves, performs and, ultimately, delivers value in projects. For each individual project or group of projects, the client's procurement strategy is what orchestrates the collaboration between design professionals, contractors and subcontractors, ensuring that client requirements are met efficiently and effectively (as outlined in ISO 10845-1). Procurement processes not only bring together these various contributors but also establish the terms of engagement, defining the roles, responsibilities, and risks that bind the parties, with the aim of achieving value for money and maximizing project outcomes.

ISO 21502 offers guidance on concepts and practices for project management that are important for and have an impact on a project's successful delivery. It is intended to apply to any public or private organization, as well as any type of project within any industry, regardless of the purpose, delivery approaches, life cycle model used, complexity, size, cost or duration. However, industry-specific adaptations of ISO 21502 are necessary for construction works projects.

The adaptations which are necessary to accommodate the specificities of the construction industry include:

- the need to simultaneously address the geography, site conditions, communities, physical environments, existing construction works, as well as a wide range of stakeholder requirements, client's value proposition and project constraints;
- an ever-changing, complex environment, often with a high degree of known and unknown risks;
- the scale and complexity of projects require high-impact evidence-based decision making with material implications for cost and outcomes;
- the frequent one-of-a-kind product which is delivered on a particular site rather than mass-produced items delivered in a factory environment;
- the frequent integration of built environment professions and engineering disciplines in the design and delivery processes;
- the delivery of a project in phases, which provides an opportunity to review and refine the project design and implementation strategy, as well as to validate the investment intention;
- the industry being almost entirely based on a competitive market environment for project cost, schedule and performance delivery;
- the nature of the contracting construction businesses which are paid for work in progress and become a conduit for payment to those businesses who do the actual work;
- projects being delivered through multiple contracts where:
 - the individual pieces in a single project have no value without every other piece being successfully completed;
 - requirements (specifications), availability of resources (supply-side issues) and the context (how and why projects take place) can change between project inception and completion, particularly where there is an appreciable time between these milestones;
- the involvement of different combinations of funders, professionals, site conditions, materials and technologies and general contractors, specialist contractors, skills and workforces on each project;
- the development or utilization of land;
- the magnitude of individual transactions which can form a major portion of the annual turnover or the assets of organizations and stakeholders involved in the process;
- construction works, with a few exceptions, being acquired to support social and economic activities and, as such, forming inputs into broader projects, beyond the construction sector.

Furthermore, the buyer-supplier relationship differs from non-construction works projects in that the buying or client function requires significant built environment professional capability throughout the process of conceptualization to implementation and maintenance, i.e. through the full life cycle of the project.

Construction works projects are delivered through a supply chain. Contracts bind the participants in the supply chain. The delivery of construction works projects embraces:

- a “buying” or client delivery management function focusing on client delivery management practices (plan, specify, procure and oversee delivery);
- a “supply” or delivery function focussing on the management and integration of the resources required to deliver the project.

The project management function associated with projects coordinates activities to direct, integrate and control the accomplishment of agreed objectives in support of the supply function. The delivery management function, on the other hand, focuses on knowledgeable leadership, consistent governance and systematic administration of procurement, contracts and project finances.

Client procurement and delivery management practices (the client buying functions) are central to the performance of the supply chain which delivers construction works projects. Such practices have a direct impact on the realization of the client's value proposition for the project, i.e. the promise of measurable benefits. Delivery management is required to transform the value proposition associated with a business case into project outcomes. Accordingly, delivery management focuses on the client's practices in delivering the client's value aspirations for a construction works project whereas project management focuses on practices to accomplish agreed objectives. The ISO 10845 series focuses on the characteristics of procurement processes, methods and procedures and the detail relating thereto, concentrating on the evaluation and award phase of procurement. There are several options relating to how construction works are funded and how design and interface management responsibilities are allocated. There are also options relating to the different types of contracts that may be entered into during the delivery cycle of a project, how contractors and suppliers are to be remunerated, how secondary objectives are to be promoted through a contract and how the market is to be approached to solicit tender offers. Such choices impact upon project outcomes. ISO 22058 provides guidance on the development of procurement strategy and the procurement tactics which are necessary to effectively implement a procurement strategy.

This document focuses on delivery management and is of particular relevance to clients that engage regularly in the delivery of construction projects. It provides guidance on the client organization's function to plan, specify, procure and oversee the delivery of construction works projects, enabling the business case to be converted into project outcomes. A client can be a project owner or an entity within a supply chain which contracts for goods and services or any combination thereof. This document applies primarily to clients who have a continuous flow, or pipeline, of projects. Nevertheless, much of the guidance can be adapted for use by occasional clients who have construction works projects delivered through trusted delivery teams.

[Annex A](#) describes the core systems associated with the delivery of construction works projects, namely a planning and budgeting system, an asset management system, a delivery management system and a procurement system. It also indicates the forward and backward linkages between such systems. [Annex B](#) provides a control framework which enables project delivery risks to be appropriately and proactively managed and renders the project delivery system capable of being audited. [Annex C](#) provides guidance on the specifying of requirements.

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Construction project governance — Guidance on delivery management

1 Scope

This document provides guidance on:

- a) the role of the client in the effective and efficient delivery of construction projects;
- b) delivery management practices which enable the client's business case to be transformed into project outcomes in a manner which consistently realizes value for money.

This document is applicable to private sector, public sector or community organizations.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <https://www.electropedia.org/>

3.1

asset management plan

documented information that specifies the activities, resources, costs and timescales required for an individual asset, or a grouping of assets, to achieve the *organization's* (3.10) asset management objectives

Note 1 to entry: The grouping of assets may be by asset type, asset class, asset system or asset portfolio.

Note 2 to entry: An asset management plan is derived from the strategic asset management plan.

Note 3 to entry: An asset management plan may be contained in, or may be a subsidiary plan of, the strategic asset management plan.

[SOURCE: ISO 55000:2024, 3.2.5, modified — The abbreviated term "AMP" has been removed.]

3.2

brief

document that states the requirements for a project

[SOURCE: ISO 6707-2:2017, 3.2.18, modified — The US preferred term has been removed.]

3.3

business case

documented justification to support decision making about the commitment to a project

Note 1 to entry: A business case summarizes the scope, benefits, costs and *risks* (3.20) of a proposed solution to a business need.

[SOURCE: ISO 21500:2021, 3.2, modified — "programme or portfolio" at the end of the definition has been removed; note 1 to entry has been added.]

3.4
client

person or *organization* (3.10) initiating and financing a project and approving the *brief* (3.2)

[SOURCE: ISO 6707-2:2017, 3.8.2]

3.5
client delivery management team

individuals or entities who, through coordinated actions, are responsible for performing the *delivery management* (3.8) functions associated with *project delivery* (3.15)

3.6
construction works

everything that is constructed or results from construction operations

[SOURCE: ISO 6707-1:2020, 3.1.1.1, modified — The US preferred term and notes to entry have been removed.]

3.7
contractor

person or *organization* (3.10) that undertakes *construction work* in accordance with a contract

[SOURCE: ISO 6707-2:2017, 3.8.6, modified — The US preferred term has been removed.]

3.8
delivery management

critical leadership role played by a knowledgeable *client* (3.4) to plan, specify, procure and oversee the delivery of *construction works* (3.6) projects including knowledgeable leadership, consistent governance and systematic administration of *procurement* (3.12), contracts and project finances

3.9
feasibility study

evaluation of a proposed *project*, the practicability of its achievement, potential *risks* (3.20) and the design, financial, economic, social and environmental implications

[SOURCE: ISO 6707-2:2017, 3.3.16, modified — "potential risks" has been added.]

3.10
organization

person or group of people that has its own function with responsibilities, authorities and relationships to achieve its objectives

[SOURCE: ISO 55000:2024, 3.3.1, modified — Notes 1 and 2 to entry have been removed.]

3.11
performance

ability to fulfil required functions under intended use conditions, behaviour when in use or impact on economic conditions, the environment, society or quality of life

3.12
procurement

process which creates, manages and fulfils contracts relating to the provision of goods, services and *construction works* (3.6) or disposals, or any combination thereof

[SOURCE: ISO 6707-2:2017, 3.5.18]

3.13

procurement document

documentation used to initiate or conclude (or both) a contract

[SOURCE: ISO 10845-1:2020, 3.25]

3.14

production information

information which provides the detailing, *performance* (3.11) definition, specification, sizing and positioning of all systems and components enabling either construction or the production of further information for construction

3.15

project delivery

combination of all planning, technical, administrative and managerial actions and activities associated with the construction, supply, refurbishment, rehabilitation, alteration, maintenance or disposal of *construction works* (3.6)

3.16

project delivery team

individuals or entities who, through coordinated activities, are collectively responsible for producing project deliverables

3.17

project delivery management plan

plan which, as a minimum, summarizes the *asset management plan* (3.1), provides a credible forecast of current and net demand for *construction works* (3.6) or requirements for functionality and prioritizes projects against a forecasted budget over a number of years

3.18

project management

coordinated activities to direct and control the accomplishment of agreed objectives

[SOURCE: ISO 21502:2020, 3.24]

3.19

project value

outcome of *client* (3.4) decision making to achieve an optimal balance of the project benefits, *risks* (3.20) and costs

3.20

risk

effect of uncertainty on objectives

Note 1 to entry: An effect is a deviation from the expected. It can be positive, negative or both, and can address, create or result in opportunities and threats.

Note 2 to entry: Objectives can have different aspects and categories and can be applied at different levels.

Note 3 to entry: Risk is usually expressed in terms of risk sources, potential events, their consequences and their likelihood.

[SOURCE: ISO 31000:2018, 3.1]

3.21

scope of work

document that specifies and describes the goods, services, or *construction works* (3.6) which are to be provided, and any other requirements and constraints relating to the manner in which the contract work is to be performed

Note 1 to entry: The term “scope of work” is a generic term that may be used to describe that which is commonly referred to in forms of contract and publications as

- a) supply contract: scope, goods information or specifications
- b) service contract: scope, services information, specifications, scope of services, terms of reference or technical specification
- c) construction contracts: works information, *production information* (3.14), specifications, project specifications, *performance* (3.11) requirements, specification of work or scope.

Note 2 to entry: The term “scope of work” is also sufficiently broad to include design and *procurement* (3.12) requirements in design and construct, develop and construct and management contracting strategies relating to construction contracts (see ISO 10845-2 and ISO 22058).

[SOURCE: ISO 10845-1:2020, 3.29, modified — In note 2 to entry, the reference to ISO 22058 had been added.]

3.22

stakeholder

person, group or *organization* (3.10) that has interests in, or can affect, be affected by, or perceive itself to be affected by, any aspect of the project

[SOURCE: ISO 21500:2021, 3.18, modified — “programme or portfolio” at the end of the definition has been removed.]

3.23

sustainable development

development that meets the environmental, social and economic needs of the present without compromising the ability of future generations to meet their own needs

[SOURCE: ISO Guide 82:2019, 3.2, modified — Note 1 to entry has been removed.]

3.24

value for money

optimal use of resources to achieve intended project outcomes

Note 1 to entry: Optimal use of resources results in the most desirable possible outcomes given expressed or implied restrictions or constraints.

[SOURCE: ISO 10845-1:2020, 3.40, modified — “project” has been added.]

3.25

value proposition

promise of measurable benefits

Note 1 to entry: The *client's* (3.4) *business case* (3.3), vision, values and project priorities collectively make up the client's value proposition for a project

4 Delivery management concepts

4.1 Fundamentals of construction works projects

Construction works result from the management and integration of five primary resources, namely finance, people, materials, plant and equipment. Such works are delivered through a supply chain which is procured, mobilized and directed to provide the necessary professional services, labour and equipment, materials, products, components, assemblies and plant required to provide the works.

Contracts bind the participants in the supply chain (professionals, general contractors, suppliers of materials or equipment, suppliers, manufacturers, fabricators, service providers, subcontractors, etc.) and define the obligations, liabilities and risks that link the parties together. Direct contracts can be entered into with consultants, service providers, suppliers and contractors who, in turn, may subcontract some of their responsibilities under their contracts to subcontractors. The client's packaging strategy is a component of a procurement strategy that focuses on the organization of work into contracts or orders issued in terms of a framework agreement. This modifies the number of contractual relationships which the client must put in place, oversee and administer (see ISO 22058).

Subcontracting is a well-established practice in the construction industry. It is an effective means of involving small, medium and micro enterprises in the supply chain for the delivery of construction works. The contractor provides the overall planning for the project, coordinates the multiple interfaces between the sub-contractors and, unless otherwise stated in the contract with the client, remains responsible for providing the works as if the work had not been subcontracted. Subcontractors in turn manage their own work on site and off site.

4.2 The delivery process

4.2.1 Overview

Construction works projects are necessary to support organizational strategic objectives according to an organization's purpose and values. The client's business case, vision, values and project priorities collectively make up the client's value proposition for a project. A client should provide effective leadership of the project throughout the delivery cycle, commencing at a strategic level and ending at the close out of a project. A client must also:

- obtain the necessary resources which primarily relate to finance, people, materials, plant and equipment, to deliver the project;
- contract and mobilize a supply chain (linked set of resources and processes) to provide the necessary professional services, labour and equipment and to manufacture or supply materials, products, components, assemblies and plant;
- make executive decisions to enable project delivery outcomes which realize benefits for not only the organization but also for internal or external stakeholders.

Figure 1 illustrates the process whereby a client's value proposition is transformed into project delivery outcomes (see ISO 22058). Project outcomes result in construction works projects with the required functionality, performance, and quality in all its forms, ready for use, with a concomitant impact on the three aspects of sustainability (economic, environmental and social; see ISO 21931-1 and ISO 21931-2). Project value, on the other hand, is the outcome of client decision making to achieve an optimal balance of the project benefits, risks and costs.

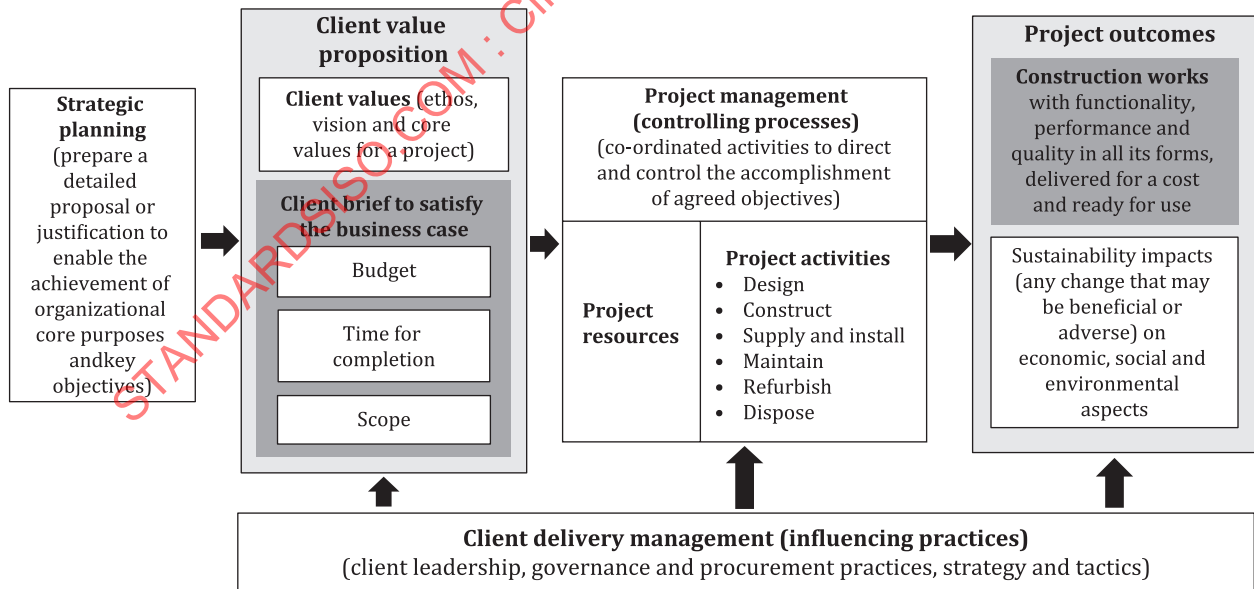


Figure 1 — Translating the client value proposition into project outcomes

4.2.2 Organizational governance practices

Each organization has its own functions with responsibilities, authorities and relationships to achieve its objectives and a governing body which has ultimate accountability for the whole organization. Organizations are guided by governance frameworks (strategies, policies, decision-making structures and accountabilities through which the organization's governance arrangements operate), which ensure that the organization remains true to its purpose (see ISO 37000).

Project delivery is necessary to support the strategic and business objectives of client organizations according to their purpose and values and must be delivered within the client's organizational governance framework. Client organizational governing bodies should hold management to account to ensure that construction works projects embrace the culture, norms and practices of the organization and align with its purpose. They should make decisions informed by credible information and reliable data, anticipated operational costs, stakeholders, ethical and societal expectations, compliance obligations, open and honest reporting and natural environment limitations and impacts (see ISO 37000).

4.2.3 Controlling practices

The purpose of controlling a project is to monitor and measure performance against an agreed plan, including authorized changes, taking account of the following when doing so (see ISO 21502):

- the business need is frequently satisfied through multiple contracts which should be procured and managed in such a way that the anticipated benefits are progressively realized;
- there are several interfaces and interdependencies between contracts where delays in or failure to put in place one contract or timeously complete a contract or a part thereof has a knock-on effect which not only delays project completion but can significantly increase project costs;
- demand is most often determined and managed through service life plans which are based on an assessment of current performance against desired levels of service or functionality and asset management plans which provide a credible forecast of current demand and net demand for services or requirements for functionality over a period of time;
- demand should be proactively managed through the planning, evaluation and award and contract management phases to prevent scope creep, i.e. changes, continuous or uncontrolled growth in a project's scope, at any point after the project commences;
- a range of different combinations of goods and services with differing characteristics such as initial cost, reliability, life-cycle costs, and operating costs can satisfy user requirements;
- risks are high due to uncertainties at the time when the contract is concluded;
- a supply chain frequently must be contracted, mobilized, and overseen to provide the necessary professional services, materials, products, components and assemblies, equipment and labour to fulfil the requirements of contracts;
- the final or outturn contract price equates to:
 - the sum of the initial contract price for work, which is known;
 - the cost of changes in scope of contract (variations) to enhance quality performance or to address shortcomings which can impair performance;
 - the amount of contract price adjustment for inflation provided for in the contract;
 - the cost of risk events that materialize in the execution of a contract for which the supplier or contractor is not responsible (see ISO 10845-1:2020, Annex E).

4.2.4 Influencing practices

During the process of converting a value proposition into project outcomes, the client should perform the following delivery management practices to realize project value:

- plan - decide on what should be done, how it is to be resourced and achieved and in what time frames, and set a budget;
- specify - define the organization's functional and other requirements for the project clearly and precisely;
- procure - obtain project resources (internal and external) to perform project activities with care and effort;
- oversee delivery - observe and define the execution of the project to realize the organization's value proposition associated with the project justification.

Delivery management includes a “buyer function”, which requires significant built environment professional capability throughout the full life cycle of the project (see ISO 10845-1:2020, Annex B).

NOTE Delivery management activities include planning at a programme and project level.

4.3 Procurement cycle associated with the delivery of a construction works project

A typical procurement cycle for the delivery of a construction works project is indicated in [Figure 2](#) (see ISO 22058:2022, Annex A). It comprises three phases, namely;

- a planning phase during which decisions are made as to what, where and when goods and services are required, how the market is to be approached and what is the number, type, nature and timing of the required contracts;
- an evaluation and award phase during which contracts are entered into following the development of procurement tactics enabling a procurement strategy to be effectively implemented and the application of the method by which tender offers are solicited from the market;
- a contract administration phase during which compliance with requirements, changes in requirements and risk events which manifest during the execution of contracts are managed, the works are commissioned and contracts are closed out.

Construction works projects are identified during strategic planning processes or through the identification of critical needs identified within an asset management system (see [Annex A](#)). Thereafter projects should be motivated by considering the benefit of the project or the consequences of not undertaking the project, or both.

Procurement strategy is required to engage with the market commencing with a make-or-buy decision and, if the decision is to make, whether design and interface management responsibilities are to be retained or transferred (see ISO 22058). During the planning and specifying stage, a strategic brief is developed, which defines project objectives, needs, acceptance criteria and client priorities and aspirations, and which sets out the basis for the development of a concept report. A concept report is then developed which sets out a viable solution to the strategic brief (see [Annex B](#)). A decision is then made to implement the project. A gateway review or financial feasibility studies may be required to inform this decision.

During the evaluation and award phase, procurement tactics are developed to effectively implement the adopted procurement strategy (see ISO 22058) and procurement documents are developed (see ISO 10845-1, ISO 10845-2, ISO 10845-3 and ISO 10845-4) prior to approaching the market for the services of a contractor. Tender offers are then solicited and evaluated, and a contract is awarded to the successful tenderer (see ISO 10845-1).

The delivery of construction works should be overseen during the contract administration phase where contracts are administered in accordance with the administrative procedures included in the conditions of contract and compliance with the requirements of the contract is confirmed. The commissioning of the works, the handing over of the works to the end user or operator and the close out of the contract should also be overseen.

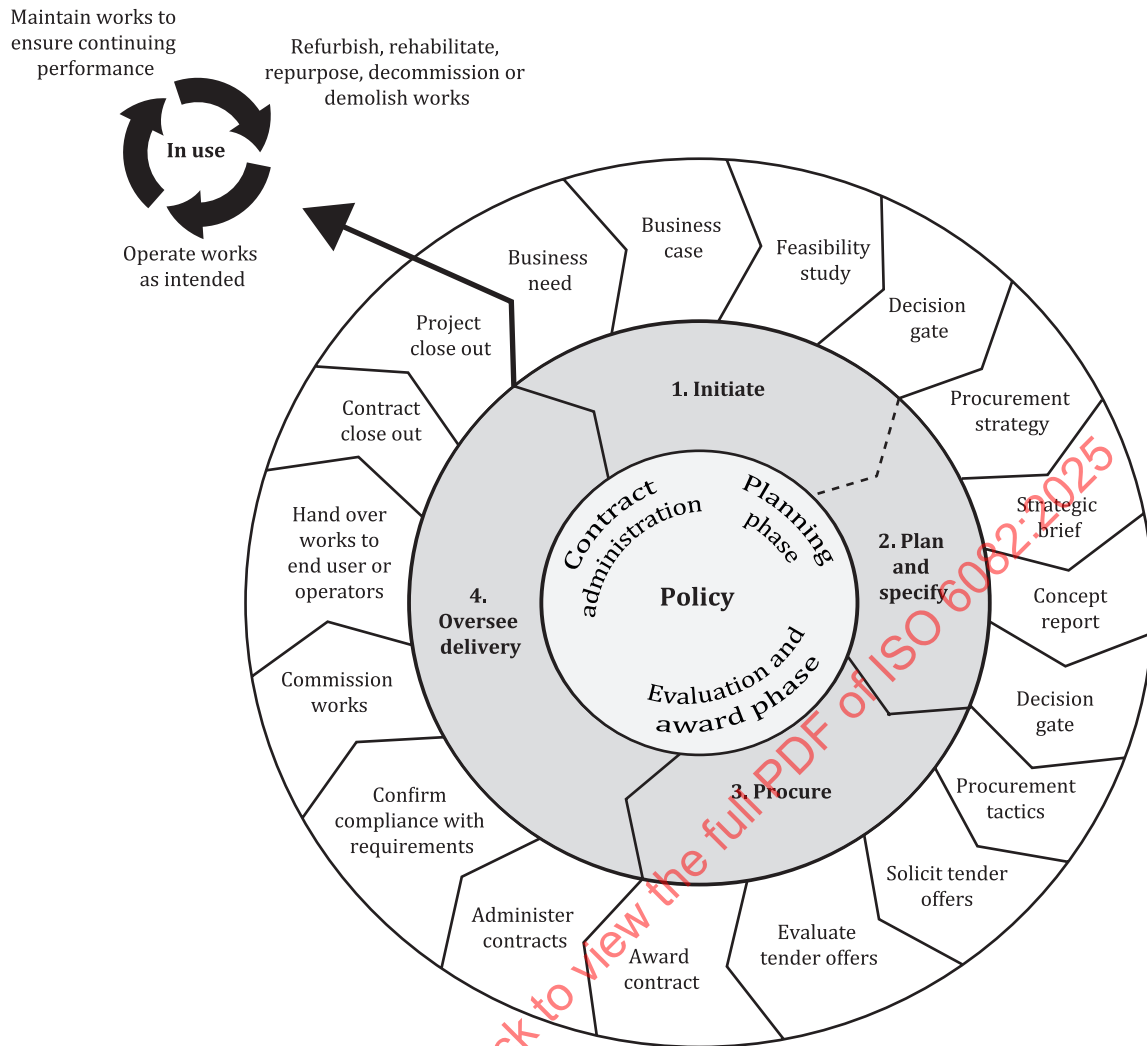


Figure 2 — The procurement cycle for construction works (ISO 22058)

NOTE [Figure 2](#) indicates the procurement cycle for new construction works. Although the project ends following the close out of the contract, procurement of resources can be required to operate and maintain the construction works in use. Projects to refurbish, rehabilitate, repurpose, decommission or demolish existing construction works can be required in which case new projects will be initiated using many of the subphases indicated in [Figure 2](#).

4.4 Context for project delivery

4.4.1 Regional, organizational and project context

4.4.1.1 Overview

Activities associated with construction works projects take place within a regional, organizational and project context. [Figure 3](#) depicts these project informants as a sequence of ideas each of which establishes the system boundaries for the next. Different role players in the delivery process are commonly required to manage these system boundaries. Typically, the organizational governing body manages the interface between the underlying regional content and the organization, the client delivery management team manages the boundary between organizational constraints and the project controls while the project delivery team manages the boundaries between the project controls and activities.

Themes associated with the social, ethical, cultural, economic, political and physical characteristics of a region can impact adversely or beneficially on the delivery of construction works projects. The regional themes also shape and constrain an organization's governance system. Organizational constraints including

law and regulation, organizational governance, values, financial, policy and technology in turn constrain aspects of construction works.

4.4.1.2 Organizational constraints

Regional themes, such as those indicated in [Figure 3](#), shape and constrain the system by which an organization is directed, overseen, and held accountable for achieving its defined purpose which, at its foundation, includes (see ISO 37000):

- setting the purpose, mission, vision, organizational ethos, organizational values, and culture to give the organization direction;
- steering the strategy and balancing resources appropriately to achieve that purpose;
- exercising oversight of the organization's performance, ensuring compliance and viability;
- engaging with and accounting to stakeholders.

Organizations have executive managers who have authority delegated from the governing body for the implementation of policies and strategies to fulfil the purpose of the organization. Governance involves setting and being accountable for the purpose and parameters for the organization, whereas management is about fulfilling the associated objectives within those parameters. Accordingly, governance authorizes, directs, empowers, provides oversight and limits the actions of management while management works within the constraints set by the organization's governance to achieve the organization's objectives. Management is about getting the work done whereas governance is about ensuring that the right purpose is pursued in the right way.

Organizations may put in place several systems to effectively implement aspects of governance frameworks across all units within the organization. These systems can include quality management systems (see ISO 9001, ISO 9004 and ISO 10006), environmental management systems (see ISO 14001), business management continuity systems (see ISO 22301), security management system, including those aspects critical to security assurance of the supply chain (see ISO 28000), anti-bribery management systems (see ISO 37001), risk management system (see ISO 31000), auditing management system (see ISO 19011), occupational health and safety management systems (see ISO 45001) and compliance management systems (see ISO 37301).

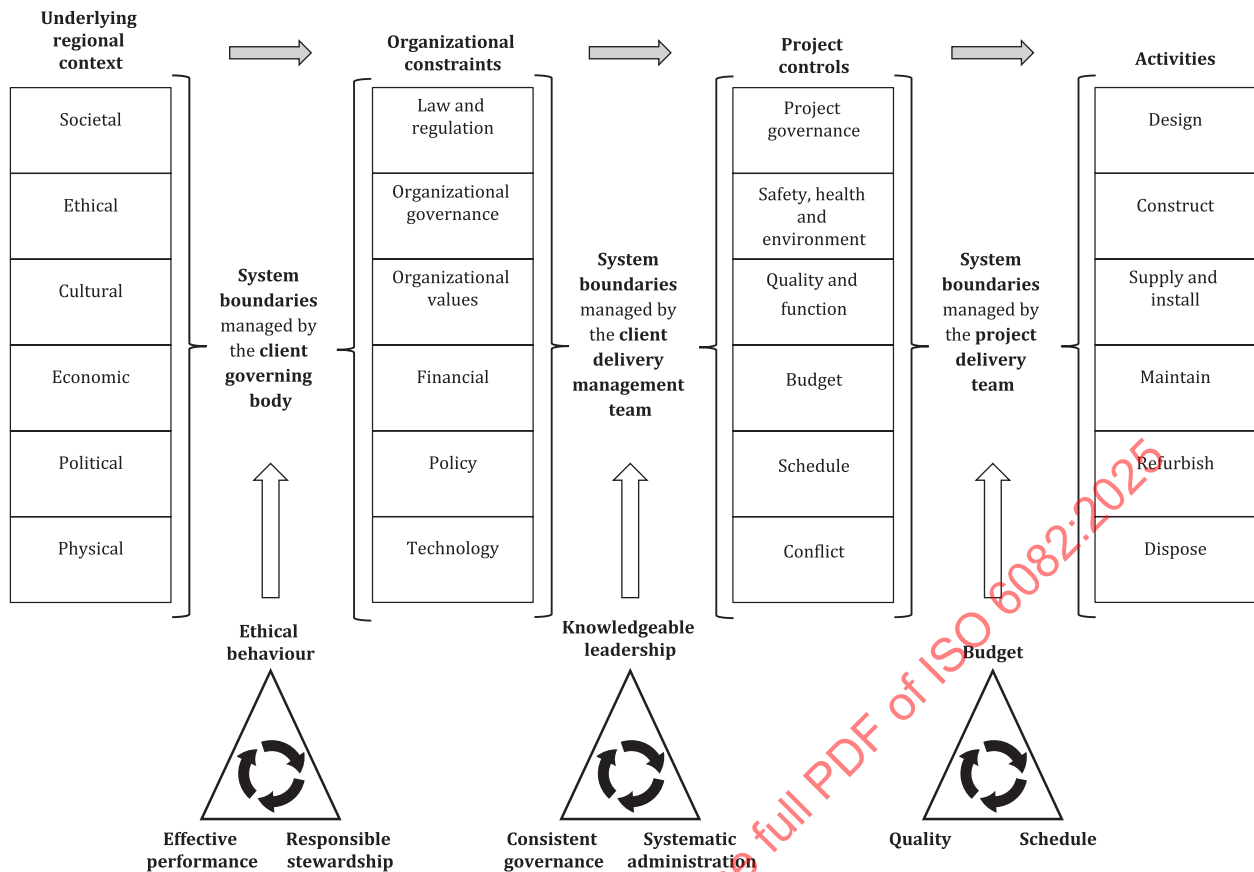


Figure 3 — The context within which project delivery takes place

Governing bodies may also put in place specific policies to:

- integrate project, programme and portfolio management with the organization's overall governance (see ISO 21505, ISO 21503 and ISO 21504);
- integrate sustainability within procurement (see ISO 10845-1:2020, Annex C and ISO 20400);
- address impacts of organizational decisions and activities on society and the environment (social responsibility) (see ISO 26000), resilience in the supply chain, governance in information technology for the organization (see ISO/IEC 38500), and the management of collaborative business relationships (see ISO 44001);
- ensure interoperability in information management systems during the various stages of a project (see ISO 19650-1 and ISO 19650-2).

4.4.1.3 Project governance

Projects are delivered against a client's brief which is informed by:

- the client's business case for a project;
- the client's value proposition for a project which can be realized in the delivery of the project.

The activities directly related to the provision of construction works take place within project management controls which seek to accomplish agreed project objectives. Such objectives are fulfilled by a combination of (see ISO 21502):

- deliverables - unique and verifiable elements that are required to be produced by a project;
- outputs - aggregated tangible or intangible deliverables that form the project result;

- outcomes - change resulting from the use of the output from a project;
- benefits - created advantage, value or other positive effect.

The focus of project management controls is primarily on budget, schedule, function, quality, conflict, health and safety and the environment. Project management controls are informed by delivery constraints which in turn are shaped within regional characteristics and the organization's governance system as indicated in [Figure 3](#).

Controls can also be included to address:

- compliance with organizational policies;
- additional client goals in the form of key performance indicators (KPIs) which can be measured, quantified, verified and audited for compliance and can be reported on during the execution of a project (see ISO 10845-1:2020, Annex G and ISO 22058);
- benefits (see ISO 21502).

4.4.2 Risk

4.4.2.1 Causes and sources of risk

Although many construction works projects are similar in nature, each project is unique and presents its own set of risks. This is due to several important project variables employed in delivering the required construction works including:

- what is delivered, differences between locations where the construction works projects are delivered, the client's value proposition for projects, stakeholder influences, resources employed, constraints, and processes and procurement practices;
- different combinations of funders, clients and built environment professionals, site conditions, materials and technologies and general contractors, specialist contractors, skills and workforces.

Construction works projects must be planned, specified, procured and delivered. Once decisions are made on what the project must deliver, who will deliver it and how it will be funded and governed, the remaining decisions centre on how it will be managed through to completion. Such management takes place within a project-specific environment which continuously involves the management of risk events, which may be foreseen or unforeseen, and which have the potential to negatively impact on project outcomes during the protracted delivery process.

Sources of risk in construction works projects include those relating to client or owner behaviour, human behaviour, community opposition or unrest, design (omissions, interfaces or changes), economic circumstances, finances, force majeure, political and regulatory frameworks, project governance, technical aspects, technology, third parties (subcontractors or suppliers), environmental safeguards, natural events, weather and inherent site conditions. Risks can also manifest in weak clients who are not capable of making timeous decisions or have difficulty in providing information timeously or in paying promptly for work done.

4.4.2.2 Allocating risk between the client and the contractor

Risks that are known with total or specific certainty can generally be identified by the parties in the analysis of risks. Unknown risks with general and total uncertainty are generally new and emerging risks, which in all probability are not predicted or included in the risk analysis.

A central issue that must be dealt with in construction works projects is the financial liability related to the risks which can manifest during the performance of the contract. The parties (client and contractor) to a contract can exercise choices on how to deal with inherent project risks, the focus of which is on the payment and responsibility for the cost of the event should it materialize. Risk can be contractually retained or transferred. In some instances, insurances can be taken out to cover risks, for example, as a hedge against adverse currency exchange rate fluctuations or to cover storm damage to the works. The contractor tries to limit liability in contracts to a foreseeable figure, includes an allowance for risks in his or her tendered prices

and spreads the risk across the projects. The contractor is paid its risk allowance included in the prices irrespective of whether a risk event occurs. The client may share risks with the contractor to reduce risk pricing but must make provision for contingencies in the budget to fund risk events for which the contractor is not at risk, that may materialize during the performance of the contract. Increasing the risk borne by the contractor inevitably increases the price of the contract. Conversely, if the client retains certain risks, it only pays for risks that materialize. Value for money is achieved when the efficiency gains by transferring risk are higher than the losses from inefficient risk pricing, particularly where tenders are awarded based on least cost.

4.4.2.3 Implications of excessive risk transfer

The more risk that is transferred through contracts, the less willing firms are to submit tenders. Not all firms have sufficiently large balance sheets to accept the full construction risk. Incumbents in local markets may have information and experience that gives them an advantage over new entrants. Less competition in turn can have a knock-on effect on risk pricing. Reducing uncertainty for new entrants increases the competition in the local market. The higher the uncertainty, the higher the risk pricing. An underestimate of risk results in the “winner’s curse” which can lead to a failure to deliver on contractual obligations. The winner is often the tenderer who least overestimates the risk.

Drivers of inefficient risk pricing include excessive transfer of risk, tender requirements which require a high degree of certainty, availability of sufficient and reliable information and sufficient time for preparation of tenders. Risk pricing inefficiency can be reduced through design clarity and flexibility, following established risk allocation principles where the key objective is to contain the cost of the risk, and considering the benefits of joint risk management. Relational contracting based on collaborative procurement strategies to manage unforeseen events in complex projects, early contractor involvement and alliancing can also lead to a reduction in risk pricing.

4.4.2.4 Framing of delivery models

Delivery models are framed around the retention of risk by the client and the transfer of risk to the contractor. Procurement strategies and tactics influence project outcomes. Differentiators between delivery models include:

- the treatment of risk (risk allocation, risk sharing, or both);
- the mitigation of risk through collaborative approaches and making use of competitive dialogue or negotiations to address uncertainties in tender processes;
- the extent to which activities external to the project are bundled;
- the associated scope of the project contracts;
- the approach to remuneration (fixed price, reimbursement or target price) within these contracts;
- positive or negative incentives such as pain-gain share regimes and performance bonds;
- how contractors get involved in the design process (early contractor involvement).

4.4.2.5 Impact of change

Change is any variation from the way work is planned, designed, budgeted or scheduled. It can arise from design changes, scope of work changes, delays in finalizing or issuing of production information, unforeseen site conditions, regulatory changes, inadequate specifications or production information, schedule changes and subcontractor performance. Change is expected on any construction works project due to evolving circumstances and requirements which can impact upon project outcomes. Change can be either positive or negative. A positive change comes about when it enhances the project outcomes or when it rectifies circumstances that would otherwise harm a project. A negative change in the absence of diligent implementation can have dire consequences resulting in cost and schedule overruns, sub-standard project outcomes, lost profits and ruined relationships.

The direct impact of any change commonly relates to added or omitted scope or delays. Although such impacts can have multiple dimensions, they are translated into adjustments to time and cost. Secondary impacts (disruption, cumulative impact, ripple effects, etc.) are the additional, or effect on the cost of performing work, which is not directly changed, i.e. the unchanged work. This is the added cost due to lowered productivity or increased rework on the unchanged work. These impacts result from out-of-sequence working, engineering rework, reduced productivity, hiring new staff with the requisite qualifications or experience to recover the programme time lost, increased overtime, night shifts, management or oversight stretch and impacts on attention span, workforce morale, out-of-sequence flow of information to vendors, partners, etc.

The secondary impacts of change on a project are difficult to address and define as they:

- can be widely separated in space and time from the cause, but must be tied to their source;
- can be cumulative across large numbers of individual impacts;
- are fundamentally about productivity and rework, which are hard to measure
- present a challenging analytical task to quantify.

NOTE The secondary impacts of change can have a far greater impact on the project than the direct impacts of change as they grow disproportionately over more and more changes and appear sometime after the initial change event has occurred and variations in project conditions drive different secondary impacts. Early resolution can cut their impact significantly. Secondary impacts can be significantly reduced by less tight project schedules.

4.5 Client organization inputs into projects

4.5.1 Overview

An organization, functioning as a client, initiates and finances a project and approves the requirements for the project as captured in a brief and any changes thereto. The principal function of the client organization is to ensure that a solution to the business case for a project is achieved. The client, as such, owns the business case of the project and is accountable for project outcomes. The client should provide effective leadership of the project throughout the project delivery cycle, commencing at a strategic level and ending at the close out of a project. The client also must obtain the necessary resources to deliver the project and make executive decisions to enable project delivery outcomes, which realize benefits for not only the organization but also for internal or external stakeholders.

A client should:

- establish a clear business case which captures intent, at the inception of a project, and constantly revisit the business case to verify its assumptions, objectives and ongoing validity;
- carefully monitor objectives and remain vigilant for changes throughout the project delivery cycle that can impact on a project and its business case;
- ensure that adequate maintenance regimes and protocols are put in place to ensure long-term sustainability of the construction works that is delivered;
- ensure compliance with legislative provisions including those relating to health, safety and the environment and the obtaining of the necessary statutory permissions;
- be bold enough to make timely decisions such initiating corrective actions if necessary and to halt, terminate or curtail the project if it becomes unviable or if there is insufficient budget to complete the project or related projects;
- pay contracted resources on time.

4.5.2 Values and vision

Values determine the ethos, vision and core principles of a project. They shape not only the culture for the project but also the “delivery intent” of a project. They typically comprise several competing aims relating

to the delivery process and delivery outcomes. Values also establish the client's aspirations for a project which are reflected not only in the delivery processes but also in the construction works. Legislation can establish minimum requirements relating to issues such as equity, health and safety and protection of the environment. Values establish aspirations or desirable outcomes which are beyond minimum requirements embedded in legislation and policy. Values serve as broad guidelines in all situations where choices must be made regarding which path to follow. They enable those responsible for delivering projects to understand the difference between what is desirable and what is not desirable. They also serve to shape the outcome of the investment.

Vision provides direction and a sense of purpose for a project. It can be critical in justifying a project in terms of aims and investment and includes a clear description of strategic intent. Vision can also refer to the client organization's view on:

- the nature, spatial relationships, design, qualities and respective costs of its planned construction related projects;
- how different functions should be spatially arranged and grouped including the principles guiding these spatial relationships in an urban environment, precinct, estate, campus or set of campuses which may be formalized in a spatial development framework which provides ongoing guidance to development and the positioning of buildings and site services.

Client organizations should identify what is valuable to the organization (core values), as well as what values should be reflected in their construction works projects.

The organization's business case, vision, values and project priorities collectively make up the organization's value proposition for a project. Planning, design, site activities etc. associated with project delivery transform the organization's value proposition into project outcomes which impact on the three aspects of sustainability (economic, environmental and social) and result in construction works with the required functionality, performance and quality in all its forms, delivered for a cost and ready for use (see [Figure 1](#)).

4.5.3 Organizational policies which inform project delivery values

An organization's stewardship policies inform values and visions, particularly those relating to sustainable development and socially responsible behaviour in relation to the natural environment and social, and economic context within which it operates. Such policies seek to utilize organizational resources in a responsible manner by effectively balancing negative and positive impacts, considering the global context, ensuring its contribution to sustainable development and engendering the trust and confidence of the communities within which it operates, and beyond (see ISO 37000).

Depending upon the jurisdiction within which an organization operates, legislation can regulate aspects of sustainable development and behaviour. Legislation establishes minimum requirements. Responsible stewardship policies establish organizational intentions and direction which extend beyond minimum requirements. The drivers behind such policies commonly include environmental conservation and protection, human rights and quality of life.

Sustainable development policies deal with environmental, economic and social impacts which may adversely or beneficially change the environment, economy and quality of life or society, respectively. While the challenge of sustainable development is global, the strategies for addressing sustainability in construction works are local and differ in context and content from region to region. Such strategies should reflect the context not only in the built environment, but also in the social environment which includes social equity, cultural issues, traditions, heritage issues, human health and comfort, social infrastructure and safe and healthy environments. It may in addition, particularly in developing countries, include poverty reduction, job creation, access to safe, affordable and healthy shelter and mitigation of loss of livelihoods. Given the disparities in standards of living between developed and developing nations, the approach in general to the social component is very different. This results in different development priorities between the developed nations and developing nations (see ISO 10845-1:2020, Annex C).

Organizational policies may deal with global, interregional and local environmental impacts and embrace aspects such as those identified in [Table 1](#) (see ISO 21931-1). Policies which deal with economic impacts

commonly address aspects of life cycle costs and economic value while those that deal with social aspects may relate to:

- buildings (see ISO 21931-1) including:
 - accessibility (access to the building and its services and to external services);
 - adaptability (versatility, convertibility, expandability and modifiability);
 - health and wellbeing characteristics (thermal comfort, indoor air quality and visual comfort, spatial characteristics, water quality and safety in use);
 - impacts on neighbourhood (noise, emissions, glare and overshadowing, shocks and vibrations, and localized wind effects);
 - safety and security [resilience against climate change, exceptional actions (earthquake, volcanic eruptions, explosions, fire and impacts from vehicles and interruptions of utility supply), personal safety and security against intruders and vandalism];
- civil engineering works (see ISO 21931-2) including:
 - human rights;
 - labour rights;
 - health and safety of relevant stakeholders.

Table 1 — Environmental areas of concern, impacts and areas to consider

Area of concern	Impacts	Aspects to consider
Global and inter-regional	<ul style="list-style-type: none"> — climate change — depletion of the stratospheric ozone layer — acidification of land and water sources — eutrophication — formation of tropospheric ozone (photochemical oxidants) — resource depletion 	<ul style="list-style-type: none"> — use of resources <ul style="list-style-type: none"> — use of non-renewable primary energy and material resources — use of renewable primary energy and material resources — consumption of freshwater — production and segregation of waste for disposal, which includes <ul style="list-style-type: none"> — hazardous waste — non-hazardous waste — land use related to the building site — emission to air <ul style="list-style-type: none"> — emission to surface water and ground water — emission to soil
Local	<ul style="list-style-type: none"> — local impacts on biodiversity and ecology (flora and fauna) — load on local construction works (such as services and sewerage system) — effects on the local microclimate — impact on surface drainage 	

Policies, particularly those in the public sector may also include the use of procurement to (see ISO 10845-1:2020, Annex G):

- stimulate economic activity;
- protect national industry against foreign competition;
- improve the competitiveness of certain industrial sectors;

- remedy regional disparities;
- achieve certain more directly social policy functions, such as to:
 - foster the creation of jobs;
 - promote fair labour conditions;
 - promote the use of local labour;
 - prohibit discrimination against minority groups;
 - improve environmental quality;
 - encourage equality of opportunity between men and women;
 - promote the increased utilization of the disabled in employment.

NOTE ISO 10845-1:2020, Annex C describes sustainable procurement in a construction context. The client's sustainability value proposition can be informed by many standards. For example:

- ISO 26000 provides guidance on how businesses and organizations can operate in a socially responsible way;
- ISO 15392 identifies and establishes general principles for sustainability in construction works;
- ISO 10845-1:2020, Annex G provides guidance on promoting policy objectives that relate to the targeting of enterprises and labour;
- ISO 22058 describes key performance indicators relating to local direct employment, skills development and local content.

4.5.4 Strategic planning

Strategic planning commences with the identification of strategic objectives by the client organization. Thereafter, a client organization should establish a vision consistent with its responsible stewardship policies, conduct a needs assessment and use this to build an organizational strategy which reflects the project delivery challenges and its aspirations for the future. An outcome of the strategic planning processes is a business case which is sometimes referred to as a feasibility assessment, the purpose of which is to make informed decisions regarding the progressing of identified construction works projects and to make resources available.

The starting point is to describe the functional performance of the project and the parts thereof. Functional performance describes performance (behaviour in service) to support required functions under specified use conditions or the function or performance that a solution must fulfil for its stakeholders. As such, functional performance should be defined in terms of the purpose or activity of users or stakeholders for which construction works or a part thereof is designed, used or required to be used. It should focus on the function of the solution required and describe:

- the purpose, needs, functions and activities of users and other stakeholders to be met by construction works or a part thereof;
- what people should be enabled to do or achieve.

Functional performance specifications should focus on how the completed construction works as a system should perform, i.e. its functionality (suitability or usefulness for a specific purpose or activity). This permits a range of solutions as such a specification communicates the problem that an innovative solution is to solve as opposed to the solution itself. Such specifications should, where relevant, be accompanied by an explanation as to how the construction works is to be operated. This enables the systems architecture to be established for each interacting component which describes how the envisaged construction works will meet these requirements.

Construction works should be used efficiently and reconfigured or, where appropriate, disposed of when no longer required. Where possible, demand for construction works (requirement for functionality) should be

met with solutions which do not require the acquisition of new construction works. Maximizing the use of existing facilities or reconfiguring them, rather than constructing them, should always be a consideration. Accordingly, the level of functionality that is required should be compared with the serviceability (capacity to support the function) of existing construction works when making decisions to construct new works or to upgrade or repurpose existing works (see ISO 11863).

4.5.5 Business case and feasibility studies

Decisions relating to the initiating and implementing of construction works projects should be based on a business case which addresses the needs that the project seeks to meet. Accordingly, the business case should explain why a project is required for the organization. It should establish a value proposition which sets out the benefits, disadvantages, costs, and risks of the current situation and future vision. It should justify the investment in the project or programme of projects. A business case should also, as appropriate, include any or all of the following:

- evaluation of alternative options
- a rationale for the preferred solution,
- an indication of the return on investment or a cost-benefit analysis
- a summary of the scope, benefits, costs and risks of a proposed solution to the organization
- a comparison of technical and financing options
- a viability analysis
- an outline of the necessary environmental and social impact assessments
- due diligence assessments
- risk and sensitivity analysis
- an implementation readiness assessment.

High quality consultation and stakeholder engagement should be an integral part of the process and should not be an afterthought.

On some projects, formal prefeasibility and feasibility studies may be required for scrutiny by the funders or the client governing body. This is frequently the case where projects, for example, have a high value, a design, build and operate contract is proposed, a public private partnership is sought, or construction works projects which require special design considerations (such as new or untried technologies). Feasibility studies provide an evaluation of a proposed project, the practicability of its achievement and the design, financial, economic, social and environmental implications. They may be developed to inform decisions at appropriate decision gates.

The accuracy of cost estimates improves as the project definition matures, as projects progress. Technical, environmental and social information is usually sufficiently developed to test the viability of a project at the end of concept and viability stage described in [Annex A](#). Economic assessments can be undertaken at this point, to confirm the economic feasibility of the project from an economic, commercial and fiscal feasibility and value-for-money point of view. However, on some projects, some the design development (see [Annex A](#)) may be required before doing so.

Pre-feasibility studies may be required prior to feasibility studies to identify suitable solutions from multiple alternatives. The focus on such studies should be on documenting the owner or user requirements, shortlisting the options that were considered, providing a preliminary design for selected options and providing preliminary capital estimates and the proposed schedule.

NOTE 1 The client delivery management team can oversee or participate in the preparation of the business cases or feasibility studies. There are several advantages in doing so.

NOTE 2 The demand for construction works can flow out of service life plans into a pipeline of projects. [Annex B](#) indicates the linkages between the core systems commonly associated with the delivery of construction works projects, namely an asset management system, a planning and budgeting system and a delivery management system.

NOTE 3 Guidance on preparing a business case can be found in:

- the G20 Principles for the Infrastructure Phase, which considers critical aspects under the dimensions of project rationale, options appraisal, commercial viability, long-term affordability and deliverability;
- the Infrastructure Business Case: International Guidance, which sets out the process of developing and writing a business case through three stages (early business case, intermediate business case and full business case) and five cases (strategic, economic, commercial, financial and management).

5 Roles and responsibilities to support project delivery

5.1 Overview

Client leadership and governance are closely connected. Client governance processes should ensure that the client organization takes ownership of the delivery of construction works projects. This is an important component of the organization's business. Such delivery should be managed as an integral part of the enterprise, rather than as an ad-hoc collection of projects. This can be achieved through:

- the provision of effective governance processes which ensures that:
 - there is proper management and control of project delivery including demand management;
 - all the various parts of the organization which play a role in project delivery work together in a coordinated, efficient, and effective manner;
 - project delivery is, wherever possible, managed as a long-term and strategic system of individual yet interlinked projects aimed at meeting the organization's objectives;
- the establishment of clear delegations of authority to support timeous decision-making and to assign individual and organizational accountability for project delivery;
- the assignment of single-point accountability to a suitably qualified and experienced built environment practitioner (client delivery manager) to provide executive level leadership in the planning, specifying, procuring and overseeing of project delivery;
- the provision of control frameworks which include decision gates to enable risks to be appropriately and proactively managed and render the system capable of being audited (see ISO 10845-1:2020, Annex B and Annex E).

There is no 'one size fits all' allocation of roles and responsibilities to support project delivery as project governance arrangements should be appropriate to a particular project and client organization. [Figure 4](#), nevertheless, illustrates an appropriate allocation of roles and responsibilities aligned with the project governance arrangements whereby a client delivery manager has single-point accountability for project delivery and reports to a senior line manager and a project delivery steering committee. The line manager in turn reports to a chief executive officer who in turn reports to the governing body.

5.2 Project delivery steering committee of senior management

The client organization should establish a project delivery steering committee (governance structure of senior management) to support the effective planning, direction and oversight of the organization's project delivery programme. This is especially important where multiple projects are delivered (see ISO 21503) or there are multiple construction or supply contracts within a construction works project. Such a committee provides an opportunity to:

- establish an enabling environment for the effective performance of the buying function;

- ensure that all the various parts of the organization which perform a role in project delivery work together in a coordinated, efficient and effective manner.

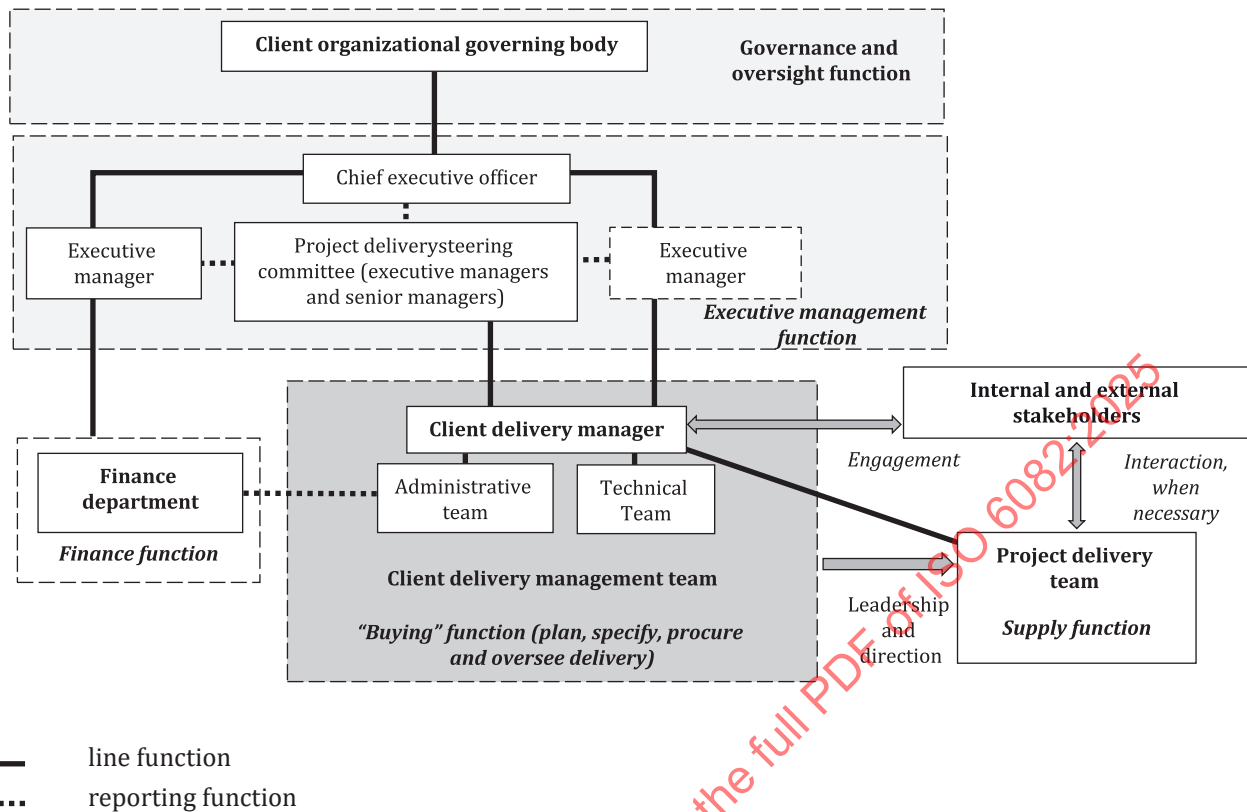


Figure 4 — Example of the allocation of roles and responsibilities in project delivery

NOTE Governance provides an organization with a structured approach to conduct both its business-as-usual activities and its business change, or project activities.

This advisory committee, which does not affect the line-function reporting requirements of project delivery, should:

- advise the chief executive officer and executive management on planning, funding requirements, procurement and delivery progress, expenditure and challenges, including any administrative blockages that impact on project delivery;
- advise the senior manager responsible for planning and delivery about the project delivery challenges and the needs of various divisions within the organization.

This advisory committee should include executive managers and senior managers within the organization including those with legal and financial responsibilities and those who are actively engaged in aspects of project delivery. It should meet at least four times per annum and should receive reports from the client delivery manager and executive manager responsible for the function of project delivery.

The project delivery steering committee should:

- instil the values that underpin the organization's project delivery;
- enable the organization, in its entirety, to own the vision and business case for project delivery, to support project prioritization and expenditure and to maintain full accountability for delivery;
- ensure that the organization's delegations of authority are adequate and appropriate to enable the client delivery manager to implement construction works projects efficiently, effectively and accountably; and to avoid the inability to make timeous decisions during implementation, which leads to contract delay and disputes, often resulting in cost increases;

- review and support the organization's spatial vision and its three-to-five-year project delivery management plan, including project priorities and budgets;
- endorse and support the vision and business case for projects;
- mediate the prioritization of competing projects.

5.3 Client delivery management team

5.3.1 Typical functions

The client typically performs two distinct functions when delivering construction works projects.

The focus of the first function, which is performed at an organizational governance level, is on the funding and project outcomes. It also involves the provision of high-level strategic direction when a corrective action is necessary to effect change. This may be to bring a project closer to what was planned or to make decisions regarding a significant departure from the plan.

The focus on the second function is typically on what should be delivered, involving the provision of:

- strategic, technical, financial and operational direction in order to realize the client's value proposition;
- what information is required to effectively oversee the implementation of the project by the project delivery team;
- settlement of what is due in terms of the various contracts.

The first function relates to ownership of the investment in project delivery. The responsibility for ensuring the strategic alignment of the project or programme is retained by the client organizational governing body.

The second function relates to specifying requirements for the project delivery team and managing construction works project outcomes in order to realize the client value proposition. Fundamental to this is the procurement and payment of the required resources and the management of those relationships to maximize value. This function, which is assigned to a client delivery management team, relates to the capability and capacity to manage the process of translating project vision and value into project outcomes during the buying process. Those responsible for this function accordingly should ensure that:

- a clear vision for the project is communicated to all participants;
- specified requirements will achieve the required benefits of the business case and provide value for money;
- momentum is maintained for the investment, appropriate to the needs of the stakeholders and the project delivery team, for the efficient delivery of outcomes;
- requirements are transformed into project outcomes, programme purpose and delivery principles before the detailed specifications of construction works;
- value is added through the establishment of relationships and the incorporation of best practice;
- interface management occurs, which aligns all stakeholder organizations to maximize the potential of the project or programme to deliver on the required outcomes;
- high-level progress is monitored, focusing on prognosis rather than detailed progress;
- expenditure can be accounted for, and assets can be readily capitalized in financial accounting systems.

Furthermore, the client delivery management team should:

- ensure that:
 - the budget contained in the business case is realistic and provides value for money;

- the schedule is not only realistic but also likely to be attractive to the construction market and attract competitive prices;
- clear briefs are provided to those responsible for delivering the project before design commences.
- focus on strategy, the project environment, the context, the business case, high level progress, corrective actions, communication, managing internal and external stakeholders and feedback from continuous improvement reviews;
- proactively manage risks which threaten project or process outcomes and changes to what was planned;
- insist that projects are commissioned and properly tested prior to completion and handover.

The precise scope and quantum of work associated with this latter function depends upon the option selected for engaging the market and the procurement strategy that is adopted (see ISO 22058). A client can adopt a procurement strategy which minimizes the number of relationships that it needs to contract and manage in accordance with its delivery management capacity.

An 'eyes on – hands off approach' should be adopted when dealing with the project delivery team. The client delivery management team should point to the problems and allow the project delivery team to provide solutions so that the responsibilities and accountabilities are not blurred. At the same time, the relationship between the project delivery team and the end users should be carefully managed.

The appointment of companies to serve as members of both the client delivery management team and the project delivery team should be avoided as conflicts of interest and loss of focus on the client's interests can occur. A separation of duties is preferable.

NOTE 1 Members of the client delivery management team can be appointed on a full time or part time basis, depending upon the project demands for their skills and expertise. Individuals external to the organization can be appointed to provide the necessary skills.

NOTE 2 The members of the client delivery management unit can be referred to as the delivery management unit.

5.3.2 Client delivery manager

5.3.2.1 General

A client delivery manager (named individual) should be held accountable for project outcomes. Such a manager should lead the client delivery management team with single-point accountability. This involves leadership at the chief executive officer level. It also requires direct access to senior client management when making decisions regarding a significant departure from the plan or budget (see [Figure 4](#)).

The client delivery manager does not necessarily need to get involved in the details of a project. Nevertheless, such a manager should understand how to mobilize the supply chain through a clear vision and an effective procurement strategy, preferably one that fosters a culture of collaboration and teamwork (see ISO 22058). Such a manager should ensure a culture of governance and accountability which:

- resonates with a high standard of professional ethics and standards and the efficient, economic and effective use of resources;
- balances the competing needs of cost effectiveness, affordability, sustainability and the use of procurement as an instrument of socio-economic policy;
- caps project scope and costs;
- avoids prohibited practices, improper conduct and maladministration whether by act or omission;
- avoids political interference resulting in improper conduct;
- balances project benefits, risks and costs;
- not only delivers value for money but also achieves results.

Crucial activities led by the client delivery manager include reporting to the governing body and recommending and recording decisions. It may also include leading the development of prefeasibility and feasibility reports to present sufficient information to determine whether the project should be implemented. This is particularly important in respect of high-value projects, construction works that requires special design considerations, public private partnerships or projects which are delivered incrementally over several years.

5.3.2.2 Primary functions

The client delivery manager's primary function should be to:

- own the business case for a project on behalf of the client so that there is no ambiguity about who is acting in the client role;
- assemble a core client delivery management team with appropriate skills in construction project management, technical expertise and administration, to provide advice to underpin consistent project success;
- perform an oversight and project governance role, providing effective and strategic leadership, within the client delivery management team, which permeates through all levels of the supply chain;
- oversee the management of scope (demand), budgets and cash flows, procurement of implementation resources, payment of contracted resources, accounting for expenditure, compliance with legislation, etc.
- set the priorities between cost, time, quality and the attainment of secondary or developmental objectives to provide crucial direction to those responsible for delivering the project when hard choices are to be made to steer a project through the complexities of decision making (see ISO 10845-1 and ISO 22058);
- lead engagements with internal and external stakeholders and utilities;
- exercise client leadership supported by senior management and the organization's governance arrangements in leading the organization in the development, as necessary, of:
 - an overarching vision for construction works and indicative norms and standards;
 - an organizational strategy for delivery management, including line-function management, contract management, access to credible specialist know-how, robust governance arrangements and a procurement policy that takes account of the specificities of project delivery;
 - a programme for the implementation of prioritized projects in the form of a three-to-five-year project delivery management plan and an implementation plan for each project or group of projects;
 - a vision and business case for each project and the clear definition of project scope;
 - a project delivery strategy that sets out the primary and secondary project objectives that collectively define the client's priorities and value proposition;
- set the team up for successful delivery and remove obstacles or blockages to progress;
- direct the project in such a manner that the value proposition expected at the end of the project is realized as far as is possible;
- intervene when necessary, for example, when relationships begin to break down, stakeholder concerns or lack of performance threatens objectives, recurring issues are not being dealt with, unforeseen risks begin to manifest, risk mitigation measures are not yielding the required results;
- take corrective actions, to align projects with what was planned or change the plan to reflect the changed circumstances;
- develop a strategy to approach the market and make decisions about when the market should be approached for resources;

- oversee the commissioning, fine tuning and handover of completed construction works projects, including information of record to the end user or operator;
- consider how resources are to be demobilized and have a project exit strategy ready should the need arise;
- perform post-implementation reviews on the differences between intended and actual outcomes and document the lessons learned.

5.3.2.3 Procurement strategy and tactics

The client delivery manager should periodically, but at least annually, review the projects contained in a three-to-five-year project delivery management plan and:

- identify the options for engaging the market in satisfying the need for new or refurbished construction works on a build or buy basis, and if on a build basis, whether to retain or transfer design and interface management responsibilities (see ISO 22058);
- develop a documented procurement strategy for implementing construction works projects which identifies the best way of achieving objectives and value, whilst considering risks and constraints and which includes (see ISO 22058):
 - a packaging strategy which focuses on the organization of work into contracts or orders issued in terms of a framework agreement;
 - a contracting strategy which focuses on the selection of a suitable form of contract including the basis for remunerating contractors and suppliers;
 - a targeting strategy which identifies the procedures for promoting secondary procurement objectives;
 - a selection method which identifies the methodology by which tenderers will be solicited from the market;
- ensure that suitable tactics are employed so that identified procurement strategies can be effectively implemented;
- ensure that standard specifications, templates for compiling tender documents and contract data and returnable schedules are developed and regularly updated, based on feedback received, for all commonly encountered types of contract;
- ensure effective contract management during delivery in a way that continuously addresses the delivery goals and identified risks.

5.3.2.4 Technical and administrative support teams

A client delivery manager should be supported by both a technical team and an administrative team.

The technical support team can be required to:

- provide advice on a range of matters, including compliance with legislative requirements, advice on emergent contractual matters and the gathering, processing and storage of information necessary to manage the delivery of projects;
- manage activities associated with the initiation of projects;
- formulate, shape and document the client's specific requirements in relation to architectural, urban planning, engineering and information communication technology aspects during the initial stages of the project
- monitor and evaluate the outputs of the project delivery team;
- establish financial and cost controls and reporting systems;

- review outcomes and outputs to meet requirements (see ISO 21502);
- advise on corrective actions to be taken to change the performance of the activity to bring it closer to what was planned or on measures to change the plan so that it more closely reflects the changed situation brought about by a departure from the plan;
- procure the necessary resources to deliver the project.

The administrative support team should prepare the necessary documents for payment by the client's finance department. For project governance purposes, this team should be required to develop and maintain, and keep up to date, the following:

- a planned procurement and commitment register to record for each project the contract value for all the contracts and, if relevant, orders issued in terms of a framework agreement (see ISO 10845-1), and the estimated value of a planned procurement so that at any point in time the total value of work that is committed for a project can be compared with the authorized expenditure;
- a contracts register to provide particulars of all contracts and, if relevant, orders issued in terms of a framework agreement (see ISO 10845-1), including information relating to the starting price, details relating to the time for completion and any changes in the prices and time for completion;
- a payments register to record all the payments that have been certified for payment against each contract and, if relevant, order issued in terms of a framework agreement;
- a purchase order register (or the equivalent thereof) which links contracts and, if relevant, orders issued in terms of a framework agreement and payments relating thereto, to the authorized amounts within the organization's financial management system.

The administrative support team should ensure that documents associated with project delivery are accessible to the client delivery management team in a suitable document management system for record and audit purposes.

5.4 Finance department

The typical functions of a finance department should be to:

- balance inflows and outflows;
- oversee the annual budget execution;
- pay contracted resources;
- account for annual expenditure.

In relation to these typical functions, duties should be clearly separated between:

- accounting for monies spent against an authorized budget and those certifying payment in accordance with the provisions of the contract;
- managing and accounting for the overall organizational expenditure and those managing and accounting project expenditure.

5.5 Project delivery team

The physical delivery of projects involving construction works necessitates that a project delivery team be put in place using an organization's own resources or procured resources, comprising as necessary:

- a project management team which manages the deployment of the members of the project delivery team;
- a design team which provides architectural and engineering services in integrating the client's requirements into workable solutions;

- a support services team which provides specialist support services in areas such as health and safety, condition assessments, environmental compliance, cost planning and control, geotechnical investigations, traffic studies;
- a supply team which manufactures, maintains, repairs, constructs, installs, provides, alters, refurbishes or rehabilitates construction works or parts thereof.

5.6 Stakeholders

Stakeholders can include the client organization, the client delivery management team, the project delivery team, regulators, financiers, custodians (caretakers of construction works throughout its life cycle), end users (beneficiaries of the business case), civil rights groups and affected communities. The project stakeholders' power influences opportunities, objectives and risks in projects. Stakeholder inputs are critical in the early stages of a project where the cost of effecting changes to accommodate stakeholder aspirations is low (see [Figure 5](#)).

Internal and external stakeholders are inevitably affected by decisions made in relation to construction works projects. Stakeholders will have diverse interests in the operations of projects of the client organization. They can perceive success differently and can exercise power to influence outcomes. When stakeholder interests are compromised or challenged by those of the client organization or its projects, there is potential for overt and covert conflicts which can manifest as opposition or hostility if stakeholder values and client's value propositions for a project are misaligned.

Stakeholder issues should be resolved through diplomacy, negotiation and, if necessary, escalation to the project delivery steering committee or the client organization's governing body. Alternatively, stakeholders' issues can be resolved by requesting assistance from individuals or third parties external to the client organization (see ISO 21502).

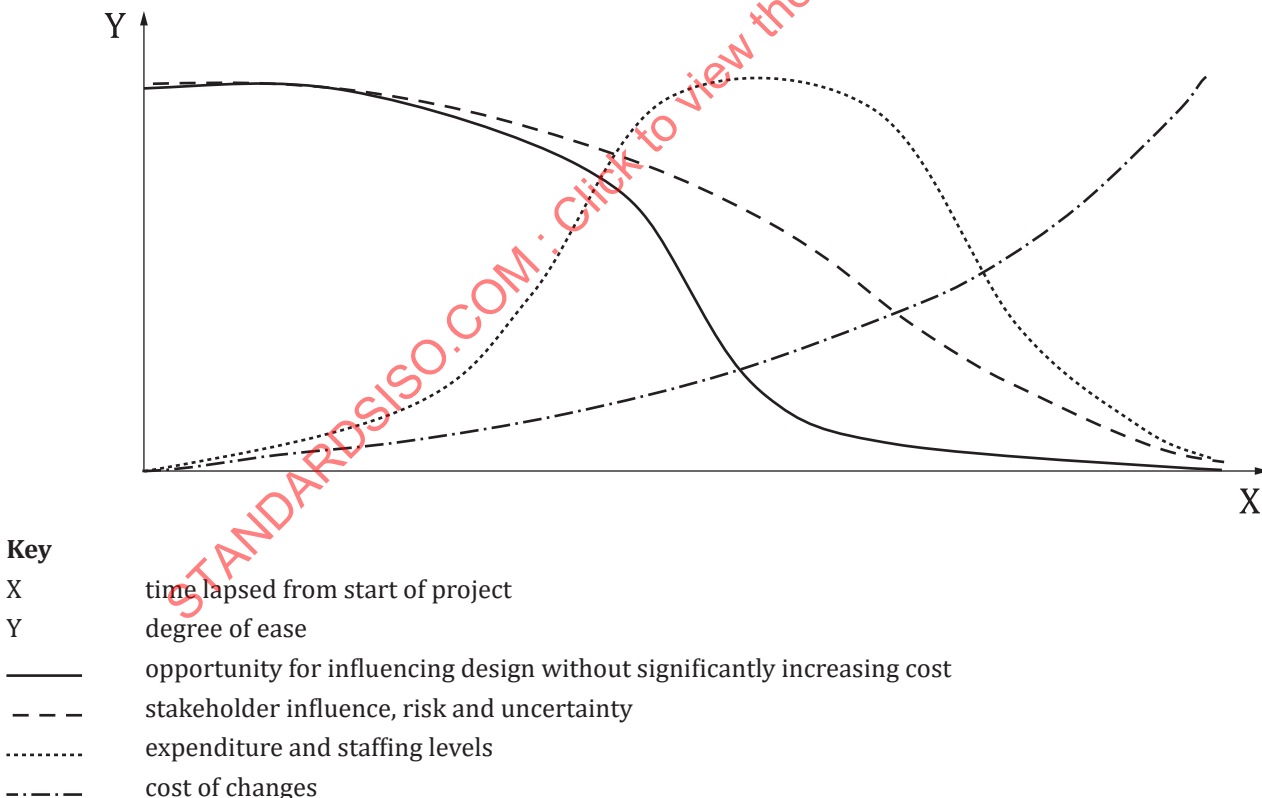


Figure 5 — Indicative impact of key variables on the delivery of construction projects over time

6 Client delivery management practices

6.1 Plan

6.1.1 Overview

Strategic planning admits projects to a pipeline of projects, which should then be prioritized, financed, delivered and, following a decision to implement, admitted into the organization's project delivery system. Admission to the project pipeline means that a need has been identified but not yet met. Such projects range from simply having been identified to being ready to implement. The impediments to implementation and the timelines required to resolve them should be known. Such impediments can relate to land identification and ownership (e.g. ownership or acquisition of third-party rights such as easements, servitudes or wayleaves, land usage or zoning and the presence of informal dwellings or graves on the site) and environmental and other legislative approvals. Once the project pipeline has been established and prioritized, alignment with broader and strategic planning processes should be confirmed and impediments to implementation identified. Although the project pipeline will contain high level estimates and project timelines, more detailed timelines and estimates should be prepared to ensure that the budget estimates are realistic, and the timelines are achievable. This project preparation stage is a critical phase of the planning process as the likelihood of implementing proposed projects within the proposed budgets and schedule put forward in any project delivery management plans should be understood (see [Annex A](#)).

The client delivery management team should present to the governing body the details of what needs to be done, how it is to be resourced and achieved, and in what time frames, and within what projected budget. This usually entails the development of a project delivery management plan for a three-to-five-year horizon and the development of a procurement strategy to commence with the delivery of each identified project and work package in at least the first year identified in the plan. It should also include the structure as well as the composition of the client delivery management team to oversee the implementation of such a strategy.

NOTE The following decision-making practices can lead to projects failing to achieve what they set out to achieve:

- optimism bias (delusion): executives are overly optimistic and thus overestimate benefits and underestimate costs;
- strategic misrepresentation (deception): executives strategically misrepresent the truth and seek to satisfy their own interests;
- escalating commitment: executives continue to follow a pattern of behaviour leading to unsuccessful outcomes rather than following an alternative course of action.

6.1.2 Site considerations

The selection of a site can have major consequences for the overall success of the project. The site selection decision has a significant impact on almost every facet of the design and construction process. For example, in the case of a building, the site selection can affect the organization, massing, functionality, sustainability, operational and economic efficiency, security, and the aesthetic qualities of the building. It can also affect the economics of the project and can have local impacts on biodiversity (flora and fauna), bulk and internal services and surface drainage.

The client delivery management team should develop a checklist along the lines indicated in [Table 2](#) which identifies the topics and issues of interest in the selection of a site and the potential questions which should be asked. Such a checklist can be applied to inform the site selection, based on a desktop study of available information, a preliminary site inspection, discussions with local professionals, limited information obtained from the local or regional authority who will be responsible for providing services, etc. More detailed investigations should be undertaken once the site has been confirmed.

Table 2 — Example of a checklist for identifying topics and issues of interest in the selection of a site for a building project

Issue	Focus	Potential questions (illustrative)
Land		
Land status	Land ownership and zoning	Who owns the land or how can it be acquired? What are the zoning restrictions, and will the site require rezoning or relaxation of existing conditions, and if so, what are the timelines? Will bulk services require land acquisition, or negotiations around third-party rights such as easements, servitudes or wayleaves? Are there outstanding land claims, transfer, consolidation or re-zoning?
Regulatory requirements	Regulatory requirements that must be met	What is the likelihood that environmental impact assessments and regulatory approvals will be required and, if so, what are the timelines? Are heritage approvals required and, if so, what are the implications for the project? What specialist studies (e.g. wetland, flora and fauna, heritage, flood line and traffic) are required to obtain regulatory approvals? Are preliminary layouts and designs required to establish the proposed project footprint for regulatory approvals? Will licenses (e.g., water) be required, and, if so, what are the timelines?
Topography and geology	Impact of topography and geology the proposed project	What are the implications for the proposed project if the site is underlain by a geology susceptible to subsidence, undermined ground or landfills? Is there potential for large ground movements arising from near surface soil horizons? Are there swamps and marshes, steep slopes, areas susceptible to flooding, high water tables etc? Is the erodibility of the soil high?
Local or regional authority		
Future plans	Future development/growth	Should agreements between relevant parties, and the provision of support to the local or regional authority for both planning and implementation be prepared?
Status quo	Capacity to deliver and maintain services	Should bulk services agreements be put in place and, if so, what are the bulk service contributions? What is the local authority's ability to provide and maintain bulk infrastructure?
Infrastructure external to the project site (water, electricity, wastewater, roads and stormwater) and solid waste arrangements (land fill or other solid waste processing capacity)		
Regional supply	Sufficiency	What is the impact of insufficient bulk infrastructure of solid waste processing capacity on the proposed project?
Current capacity	Growth over next 5 years)	What are the risks, if any, to achieving the required levels of bulk infrastructure or solid waste processing capacity and the potential impacts on the proposed project and the possible mitigation measures?
Current condition	Reliability of the current system	What mitigation measures, if any, are required to address the unreliable systems?
Future capacity	Identification of long-term expansion	What are the likely timelines, allowing for the necessary approvals, required to provide the future bulk water infrastructure to meet needs over 20 years?

6.1.3 Predicting outturn (final) costs

The estimation of project costs takes place against the backdrop of cost envelopes, risk allocation, and probability calculations. There will always be costs which cannot be foreseen or activities that do not proceed as planned. In addition, the outturn (final) cost can be significantly different from the initial tender price and is a function of the ability of the client and a contractor to mitigate risks, predict uncertainties and manage change.

The client delivery management team should avoid placing an over-reliance on early estimates, before much of the design work has been completed. Expecting an initial forecast to stand the test of wide-ranging variables associated with the delivery of construction works projects is simply not realistic as:

- estimates used for budgetary purposes are often set at a fixed price at a point in time, before full project or programme scope and complexity are known or understood;
- scope change or scope creep often occur once work has commenced to:
 - enhance quality, performance in use or the usefulness of outputs;
- address shortcomings in planning and design;
- risk events occur during implementation which impact negatively on time, cost and quality or performance;
- failure to realize that time is a multiplier of cost as risk events which affect budget or schedule can happen, especially when a project is active for longer;
- fragmentation in design - those responsible for design and those responsible for construction are not brought together at an early stage.

Mitigation measures can include delivery management practices such as adopting a strategic and tactical approach to procurement, collaborative (team) working between all who are engaged in a project and early contractor involvement and transferring design responsibilities to contractors. Realistic and credible estimates are a prerequisite for successful delivery.

6.1.4 Whole life costs

Whole life costs should inform decision making. All significant and relevant initial, potential and future costs and benefits associated with construction works throughout its lifetime from inception to construction, operation and disposal should be considered. Whole life-cycle costing is a better way of assessing value for money than construction costs, which can result in lower short-term costs but higher ongoing costs through the life of construction works. This can also apply to costs such as design fees, where saving money on fees at the beginning of a project can be outweighed by very much higher outturn (final costs) and ongoing costs through construction and operation (see ISO 15686-5).

6.1.5 Project delivery management plan

The demand for the delivery of construction works projects should be managed through:

- asset management plans (see ISO 55002) which:
 - are aligned to the organization's spatial development framework and strategic plans and are based on:
 - an assessment of current performance against desired levels of service or functionality;
 - a needs analysis informed by factors such as policies, norms and standards, condition assessments, functional performance, and current and forecasted levels of optimization;
 - a cost estimate for the life cycle activities comprising acquisition, operations, maintenance, refurbishment, rehabilitation or alteration as relevant, over a minimum period of 10 years;
- organizational long-term strategic and performance plans.

The client delivery management team should develop a three-to-five-year project delivery management plan which should identify and prioritize project delivery requirements within the pipeline of identified projects to meet the organization's strategic objectives and operational commitments with available resources. Such a plan should include the construction, supply, refurbishment, rehabilitation, alteration, maintenance or disposal of construction works. It should be based on:

- organizational priorities;
- operational requirements;
- consequences of doing nothing;
- the readiness of projects for implementation.

Where annual budgets are made available for projects, the plan may be based on the grouping of projects into programmes to enable cash flow projections for projects during a financial year to be adjusted and funds to be moved between projects within a programme to avoid under-expenditure without changing the purpose for which funds were approved. In such cases a portion of the total available budget for project delivery should be reserved for project preparation of future projects.

A project delivery management plan should establish for each project the high-level scope of work, the proposed time schedule, the estimated total project cost and annual budget requirements, the geographical location and any known impediments to implementation and the estimated timeframes for removing such impediments. As such the plan should:

- contain a list of projects complete with the total project budget and a breakdown of the anticipated expenditure against the budget in each financial year covered by the plan;
- contain a high-level rationale for the projects and the prioritization of projects to enable the reader to understand the thinking behind the inclusion and prioritization of projects in the plan;
- contain a schedule of impediments to the implementation of projects and the proposed time frame for removing such impediments;
- provide, if necessary, a graphical representation of the prioritized projects to enable the reader to understand their graphical location and sequencing.

The project delivery management plan is not a static document. Project parameters relating to the cost and schedule of identified projects should be adjusted as projects unfold and when new projects are admitted to the pipeline to meet evolving business needs

The project delivery management plan should be approved by the organization's governing body for implementation. Such approval should also be sought whenever a change is made to the budgets or the projects in the plan. The plan should be updated annually and approved by the governing body for implementation.

Quarterly reporting against progress in implementing the plan should be made to the organizational governance structures.

6.1.6 Procurement planning

Project outcomes in project delivery are sensitive not only to the decisions made during the planning, design and execution of such projects but also to the way resources are structured, procured and overseen to deliver such projects. The first step in the planning process is to determine whether to acquire goods and services from outside the project and, if so, what to acquire as well as how and when to procure them.

There are several approaches to procuring from the market goods and services and any combination thereof, each of which can result in different outcomes. Procurement strategy is all about the choices made in determining what is to be delivered through a particular contract, the contracting arrangements, how secondary procurement objectives are to be promoted and which selection method will be employed to solicit tender offers. Procurement strategies determine the number of contracts that must be procured and overseen as well as the capacity and capabilities of the client delivery management team which must be put

in place to oversee the delivery of the required construction works. They can also be used to mitigate risks in project delivery (see ISO 22058).

Procurement strategy and planning is informed by the project delivery management plan, particularly where multiple projects are delivered over time. It provides the spend analysis enabling the organization of work into contracts or orders issued in terms of a framework agreement (see ISO 22058).

Procurement planning is required to plan and document the procurement strategy and overall progress properly before procurement is initiated. An annual procurement plan should be developed where multiple projects and work packages are to be procured which is linked to procurement milestones such as those indicated in ISO 10845-1:2020, Annex E. This enables resources to be allocated to develop the necessary procurement documents, evaluate submissions, award contracts or issue orders in terms of framework agreements and perform the necessary governance activities.

The client delivery management team should develop the procurement strategy and an associated procurement plan and update such documents at least annually.

6.1.7 Implementation plans

An implementation plan is a plan for a project or programme of projects which, as necessary, should:

- provide information on objectives, scope, budget, schedule, key success factors, key performance indicators, the adopted procurement strategy, projected budget, cash flow and allocation of resources;
- identify major risks including those relating to health and safety and the environment;
- include a time management plan, a procurement plan, a quality plan and a communication plan.

An implementation plan should not be confused with a project delivery management plan described in [6.1.5](#). An implementation plan enables a project delivery management plan to be implemented incrementally.

The client delivery management team should develop an implementation plan for all projects identified on the project delivery management plan over a medium-term horizon (two to three years) for which a client delivery manager is responsible. Each project should be rolled up into a programme implementation plan prior to the start of a financial year. This high-level plan should be updated at least once a quarter and used as the basis for reporting to governance structures.

An implementation plan should be structured in accordance with [Table 3](#).

Delays in construction works projects are common, and not just due to poor management. Often delays are caused by unforeseen events, such as unforeseen ground conditions which are only discovered after the project has started. Accordingly, an implementation plan can also be used to manage annual project cash-flow projections during the year, so that more money can be spent on faster moving projects in a particular financial year to avoid under expenditure. This does not mean that there is a change in overall project budgets or the purpose for which funds were approved, but rather that the rate of expenditure of approved project budgets contained in the project delivery management plan can be allowed to vary within a financial year.

Table 3 — Content of implementation plan

Suggested heading		Content
No	Title	
1	Programme or project objectives	An overview of the programme or project and identified objectives
2	Scope, budget and schedule	In respect of each project, contract or work package for the financial year under consideration: <ul style="list-style-type: none"> — outline of the scope, — the authorized expenditure, broken down into financial years — the control budget for each project, broken down into financial years — the overarching control budget and authorized expenditure for each financial year — proposed or actual start and end date for the project
3	Key success factors and Key Performance Indicators	Key success factors and the key performance indicators which must be measured, monitored and evaluated
4	Outline of procurement strategy	Procurement strategy in summary form for each project or order issued in terms of a framework contract, i.e. <ul style="list-style-type: none"> — The selected option to engage the market (if applicable) - design strategy and interface management strategy — Packaging strategy - framework or non-framework — Contracting strategy - contract type, standard form of contract and procurement strategy — Targeting strategy — Selection method
5	Time management plan	A time management plan for each project in the form of a Gantt chart for the financial year under consideration, i.e. the baseline against which progress towards the attainment of milestone (key deliverables) target dates can be measured.
6	Projected budget and cash flow	The projected budget and cash flows for the financial year under consideration and subsequent financial years, which will enable planned and actual expenditure to be compared and revisions to the budget to be approved, and multiple project budgets to be managed
7	Procurement plan	The timeline for the financial year under consideration for advertising and closing of tenders and the obtaining of gate approvals leading up to <ul style="list-style-type: none"> — the award of the contract including information such as: — Tender number, title, broad scope of work — Estimated total of the prices for the contract or order — Proposed dates for approvals (see ISO 10845-1) — the issuing of an order in terms of a framework agreement including information (see ISO 10845-1)
8	Major risks	The identification of major risks and how such risks are to be mitigated or managed
9	Health, safety and environmental and socio-economic risks	An outline of the controls and measures which will address health, safety, socio-economic or environmental risks
10	Quality plan	An indication as to how quality requirements and expectations are to be met and managed
11	Communication plan	A communication plan which determines the lines of communication, and the key activities associated therewith
12	Allocation of resources	An indication of the assigned internal and external resources with implementation responsibilities

NOTE 1 An implementation plan, if correctly formulated, provides a baseline against which annual performance can be measured using metrics such as:

- expenditure incurred in the delivery of projects for the financial year against the authorized budget available to cover such expenditure;
- the average variance between planned and achieved completion of all stages and projects;
- the average time taken to complete the hand over to the end user following the completion of the works in accordance with the provisions of the contract;

- the average difference between the total of the prices in the payment certificate issued following completion of the works in accordance with the provisions of the contract and that contained in the final account during the closing out of the contract.

NOTE 2 Not all contracts associated with a project are completed sequentially. They are often completed in parallel and can involve different contract types - professional services, supply, term services and construction contracts. An implementation plan enables the client organization to understand the interfaces between contracts and the relationship between contracts and project deliverables. This enables the client delivery manager to coordinate the components of a project.

6.2 Specify

6.2.1 Overview

The client should state requirements clearly and precisely commencing with the scope of the project. Thereafter, the project scope should be developed for each element of the project to establish the authorized work required to accomplish the client's objectives. Finally, a scope of work should be developed for each contract (see ISO 10845-2:2020, Annex C) to execute the project or a discrete element or part of the project. This involves an iterative process to incorporate increased levels of details identified during the life cycle of a project and the decomposition of the defined scope of the project into progressively lower levels consisting of elements of work and contracts.

A high-level scope for the project is usually included in the business case in support of the chosen option and investment appraisal. The client delivery management team should further develop the scope of the project should it not be adequately specified or the boundaries or interfaces with adjacent projects be ill-defined.

The scope of the project should be defined clearly and unambiguously. It should be communicated to all who are engaged in the project including the project delivery team. This enables project elements to be identified within the scope of the project while considering risk and resource needs. It also provides the basis for scope management which facilitates the creation of the deliverables, outputs and outcomes to achieve the stated client objectives by (see ISO 22052):

- defining the scope of each element following the breaking down of the project into pieces of work in a work breakdown, or other type of structure, by clarifying what such elements and parts are planned to contribute to the client's objectives;
- controlling the scope by maximizing positive and minimizing the negative impacts resulting from scope changes;
- confirming scope delivery through the acceptance of outputs and outcomes.

The work breakdown structure or other type of structure that is developed also informs the identification of work packages (deliverable or project work component or a group of tasks) which are to be delivered and the procurement strategy to implement such packages (see ISO 22058).

6.2.2 Shaping the project

Projects and elements thereof should be shaped to identify their intended outputs or outcomes. An effective way of doing so is to establish functional performance requirements to define the project scope. Functional performance describes performance (behaviour in service) to support required functions. Functional performance should be defined in terms of the purpose or activity of users or stakeholders for which construction works or a part thereof is designed, used or required to be used. As such it should describe:

- the purpose, needs, functions and activities of users and other stakeholders to be met by construction works or a part thereof;
- what people require to be able to do what they want or need to do.

Specifying requirements in terms of functional performance enables the client delivery management team to focus on delivering such outcomes rather than the delivery of physical works. It also enables more scope

for innovation and flexibility in delivering a solution. It also enables project milestones to be identified and scheduled.

Functional performance requirements should be included in the employer's objectives included in the scope of work associated with a contract; see ISO 10845-2:2020, Annex C.

EXAMPLE The Treaty on the Lesotho Highlands Water Project (1986) stated that "the purpose of the project shall be to enhance the use of the water of the Senqu/Orange River by storing, regulating, diverting and controlling the flow of the Senqu/Orange River and its affluents in order to effect the delivery of specified quantities of water to the Designated Outlet Point in the Republic of South Africa and by utilizing such delivery system to generate hydro-electric power in the Kingdom of Lesotho." This functional performance requirement has remained unchanged for Phase II of the project which is scheduled to be completed by 2028.

NOTE 1 An output is something that is consumed by the users of the services. For example, a particular office building is not an output whereas a supply of serviced accommodation is.

Completion of a contract is not necessarily the primary requirement of a client. Services can be required before the construction works are complete. Accordingly, functional performance requirements can be used to identify programme milestones within a contract. For example, the construction of a road can be required to be trafficable before the works are completed to enable heavy equipment to be transported to a project site.

6.2.3 Scope of work

Functional performance requirements must be translated by the project delivery team into a scope of work for each procured resource (see ISO 10845-2). Such a document specifies and describes the state of the delivered goods or completed services or works (what is to be left behind) and communicates any constraints on how the work is to be performed. ISO 10845-2:2020, Annex C provides a checklist of items to be addressed in the scope of work.

Specifications included in a scope of work may be in the form of prescriptive specifications, performance specifications or product specifications or any combination thereof (see [Annex C](#)).

The standard of liability for design used for construction works or any part or component thereof determines the nature or form of the required specifications, namely (see [Annex C](#)):

- the skill and care normally used by professionals providing services similar to the required services;
- fit for the purpose(s) for which the construction works are intended.

The client delivery management team should develop a strategic brief which defines project objectives, needs, acceptance criteria and client priorities and aspirations, and which sets out the basis for the development of a concept report. This enables design professionals within the project delivery team to ultimately develop production information for a project for incorporation into a scope of work associated with a contract to deliver construction works. (see [Annex B](#)).

NOTE 1 [Annex C](#) describes the types of contracts and the standard of liability for design; it also provides guidance on the application of the different types of specifications and on the development of performance and prescriptive specifications.

NOTE 2 In in terms of a procurement strategy (see ISO 22058), a client can retain design responsibility, in which case the contractor undertakes construction based on production information issued by the client (design by client strategy). Alternatively, the client can assign design responsibility to the contractor.

6.2.4 Quality requirements

Quality has a pragmatic interpretation captured in the term fitness for purpose, which embraces a balance of features such as the architectural aesthetics and functionality, material and functional robustness, maintainability, user comfort, environmental sustainability and lifecycle costs, all of which are generally benchmarked against the cost of the delivered product. Design quality is much more than style or

appearance. It is a combination of the following applicable considerations which should be communicated by the client delivery management team to the project delivery team:

- functionality - how successful is the project in achieving its purpose?
- sense of place - does it have a strong identity that is deeply felt by inhabitants and visitors, or does it make a positive contribution to local landscapes within and beyond the project boundary?
- environmental improvement - does it support local ecology, which is essential to protect and enhance biodiversity or enrich ecosystems?
- build quality - how well does it perform in service?
- climate change mitigation - how does it support an environmentally sustainable society, reduce wider climate impacts and build resilience against climate change?
- quality of life - how accessible, enjoyable and safe are the spaces?

Good design is critical to the success of any construction works project. Just as important is the necessity to communicate these design ideas to stakeholders. Client delivery management team leadership is necessary in the quest for design quality.

[Annex C](#) provides guidance on the establishment of types of specifications which communicate design requirements. ISO 10845-2:2020, Annex C identifies matters which should be considered when formulating requirements to translate a design into construction works. ISO 21502 provides guidance on quality management to increase the likelihood that outputs are fit for purpose or use. ISO 9001 offers guidance on the establishment of a quality management system to consistently meet specified requirements in the delivery of construction works

6.2.5 Sustainable development contributions

The performance concept has historically been used to address fitness for intended use of various attributes of a building either as a whole or as a part thereof. Each characteristic is assessed in terms of whether it meets the required performance.

This concept has in recent years been expanded to address the relevant aspects of construction works and the potential impact of choices made regarding, amongst other things, materials, construction methods and resources, operating energy, water consumption on economic conditions, the environment, a society or the quality of life. [Annex C](#) provides the necessary framework and principles to describe the performance of construction works or a part thereof either in terms of fitness of purpose or beneficial and adverse impacts as well as the means for evaluating solutions.

Objectives in the four-level model describe in [Annex C](#) can be linked to user requirements or societal expectations, i.e. what society deems acceptable. The common drivers for objectives associated with contributions to sustainability are indicated in [Table 4](#). Performance descriptions commonly relate to the impacts of the choices made in respect of one or more of the following construction works, or a part thereof, during its production, construction, use and end-of-life stages:

- construction materials;
- construction methods and resources;
- operating energy;
- water services;
- sanitary systems.

Choices relate to aspects such as:

- emission to air;
- use of non-renewable resources;

- freshwater consumption;
- costs;
- indoor air quality;
- resilience (ability of a building or its parts exposed to an extreme event to recover an acceptable level of functionality);
- business and employment opportunities;
- social value (see ISO 26000).

Contributions to sustainable development should be described by a set of indicators which relate to its production, construction, use or end-of-life, based on the impacts of aspects of the required construction works. Benchmarks (performance levels for comparison purposes) may be established as limit values (upper or lower acceptable performance level on a performance scale), reference values (performance level on a performance scale that represents state of the art or best practice) and target values (performance level on a performance scale that represents an objective that goes beyond the reference value) (see ISO 21678).

In assessing performance, it may be necessary to specify a standard method to calculate indices so that comparisons can be made on a comparable basis (see ISO 12631, ISO 16745-1 and ISO 16745-2).

A balance should be achieved between competing environmental, social and economic impacts (changes that may be beneficial or adverse) within budgetary constraints and in the face of risks (the effect of uncertainty of objectives) that manifest during the delivery process.

Table 4 — Common drivers for objectives associated with contributions to sustainability

Subject matter of objective	Areas of concern
Usage of resources such as energy and water	Greenhouse gas emissions Use of renewable and non-renewable resources Consumption of freshwater Life cycle costs
Choice of construction materials	Use of renewable and non-renewable resources and release of emissions because of materials and energy flows Economical use of materials Potential to generate business and employment opportunities for targeted groups Formation of waste hazards
Choice of construction methods and resources	Health and safety during construction Potential to generate business and employment opportunities for targeted groups
Waste disposal	Recycling Hazardous waste
Resilience	“Bounce back” from disaster The capacity to restore not only buildings and other constructed works but also social systems following exposure to hazards
Social value	Improving local employment Enhancing community well-being Supporting local economies Fostering social inclusion Human development at the workplace Health and safety at the workplace

An alternative approach in the design of construction works is to require that account be taken as far as possible of the principles associated with standards such as the following:

- disassembly and adaptability principles (see ISO 20887);

- recommendations for usability and accessibility of buildings (see ISO 21542);
- recommendations for security measures (see ISO 23234).

6.2.6 Specification for data requirements

Asset information models and project information models are the structured repositories of information underpinning decision making during the whole life cycle of a built environment asset. This includes the design and construction of construction works, the refurbishment of existing construction works, and the operation and maintenance of construction works. The client delivery management team should understand what information is required concerning their asset(s) or project(s) to support their organizational or project objectives and express these information requirements to the project delivery team and individuals to inform their work (see ISO 19650-1 and ISO 19650-2). Such information includes the information required at decision gates to form the basis of decisions.

Data are essential for projects. Multiple project participants should be provided with access to consistent, timely and reliable information. The volume of data generated by a project must be managed. The client delivery management team should specify which information is of value for the delivery of construction works and for operating completed construction works and set project-wide standards to shape the collection, storage and exchange of data by all members of the team.

Consideration should be given to the way environmental and technical data are provided in environmental product declarations (see ISO 21930) for construction products and services, construction elements and integrated technical systems to be used in building information modelling (BIM) to assist in the assessment of the environmental performance of a construction works over its life cycle (see ISO 22057).

6.3 Procure

6.3.1 General

Clients must obtain project resources (internal and external) to execute project activities with care and effort.

Careful thought should be given to the assembly and composition of the client delivery management team which supports the client delivery manager. This is necessary to ensure not only synergy between members of the team, but also the necessary technical knowledge, skill and competence as well as the necessary organizational and leadership skills. Individuals can be contracted on a part-time or full-time basis to provide technical support and expertise, as members of the client delivery management team, to fill any gaps. Such individuals should effectively function as staff members of the client organization assuming responsibility for activities.

Clients and their procurement practices are the drivers of industry behaviour, performance and the delivery of project value. For each project, or cluster of projects, it is the client's procurement processes that brings together different design professionals, contractors and subcontractors to deliver specific client requirements in the most effective and efficient way possible (see ISO 10845-1). Procurement arrangements bind this supply chain and define the obligations, liabilities and risks that link the parties together in a process that is required to deliver value for money and project value.

6.3.2 Procurement system for project delivery

6.3.2.1 General

Procurement must be conducted in accordance with the organization's procurement system which should be underpinned by:

- a procurement policy and associated standard operating procedures;
- governance arrangements;
- procurement documents.

The organization's procurement system should:

- adequately support the procurement of all the resources required to deliver construction works projects which are capable of being occupied or used as intended;
- be linked to appropriate delegations of authority and designations of responsibility that support organizational accountability as well as project delivery imperatives in a manner that avoids delays;
- address project value rather than lowest price and recognize that better value is achieved through procurement that rewards performance;
- enable a wide range of procurement strategies and tactics which may be required to efficiently and effectively implement projects (see ISO 22058);
- include a system of record keeping pertaining to all its procurement in an accessible and searchable database in which every record can be identified and linked to a particular procurement.

NOTE 1 ISO 10845-1:2020, Annex A outlines a framework for the development of a procurement system.

NOTE 2 A procurement system that is capable of being audited, contains rigorous and documented processes, produces comprehensive and complete procurement documents and evaluation reports, discloses information, contains project delivery specific codes of ethics, and is most likely to curb corruption in its many forms. The ISO 10845 series provides a solid platform to do so.

NOTE 3 A procurement system can be structured around requirements for an open contracting system whereby procurement information and data are disclosed at prescribed points in the procurement cycle on a publicly accessible online portal in accordance with the provisions of a data standard.

6.3.2.2 Procurement policies and standard operating procedures

An organization's procurement policy (see ISO 10845-1) should as a minimum:

- determine the organization's procurement goals including those relating to the utilization and leveraging of procurement to support its policy objectives and how such goals will be measured, quantified, verified and monitored for compliance (see ISO 22058);
- establish the governance arrangements for the exercise of its procurement functions and the management of procurement processes (see ISO 10845-1:2020, Annex E);
- allocate responsibilities for taking the necessary actions at decision points and activities within processes;
- identify the procurement procedures and methods which may be applied to different categories of procurement;
- identify the term of framework agreements;
- establish requirements for recording, disclosing and reporting;
- establish ethical standards;
- identify the standard forms of contract and industry standards that may be incorporated by reference in procurement documents.

An organization's standard operating procedures should be developed to:

- execute specific tasks or to react to specific situations, processes or sets of circumstances;
- provide organizational rules and guidelines to enable the policy to be efficiently and effectively implemented.

NOTE 1 ISO 10845-1 provides a comprehensive list of items to be addressed in a procurement policy.

NOTE 2 The ISO 10845 series and standard forms of contract can be incorporated into standard operating procedures by reference.

6.3.2.3 Governance arrangements

An organization's procurement system should identify decision points that form the major boundaries to activities within the different phases of the procurement system to provide an opportunity to (see ISO 22058:2022, Annex A):

- authorize the continuation of a discrete activity within a process or the start of the next process;
- confirm that requirements are met before finalizing processes;
- provide information that enables corrective action to align the activity's performance with the plan or adjust the plan to accept and reflect changes caused by deviations.

There are many ways to manage procurement processes and their integrity. Organizations should adopt a committee system to oversee the procurement process, comprising the following committees:

- a procurement documentation committee to approve procurement documents including the evaluation criteria they contain;
- an evaluation committee to evaluate submissions strictly in accordance with the provisions of the approved procurement documents;
- a tender committee to consider any residual risks associated with the award of a contract and to approve the recommendations of the evaluation committee if their report is complete and if the reasons for the elimination of tenderers are valid and reasonable;
- a disposal committee to advise on how best to undertake disposals relating to the demolition or dismantling of construction works or its parts, and the disposal of unwanted, redundant or surplus materials, plant and equipment.

The organization's procurement policy, together with the standard operating procedures should establish the composition of these committees and the allocation of responsibilities for taking decisions at the decision points and for performing the various activities.

NOTE 1 ISO 10845-1:2020, Annex E provides a control framework which contains procurement gates, framework agreement gates, authorization gates and a gate relating to the interface with a financial management system linked to the activities associated with a negotiated, competitive selection or competitive negotiations selection method. This control framework links governance to quality management. The committee system feeds into the quality management arrangements embedded in the control framework.

NOTE 2 A control framework puts in place internal controls that formalize the way in which key procurement processes are performed. This assists organizations in adhering to legal and ethical requirements, while also focusing on risk assessment and management.

6.3.2.4 Procurement documents

Procurement documents as relevant should (see ISO 10845-1 and ISO 10845-2):

- require tenderers to submit particulars sufficient for the organization to evaluate their tenders, to establish their credentials and to assess their capabilities and capacities to perform the contract;
- set out, in a clear and unambiguous manner, the criteria by which tenders are to be evaluated and what a tenderer must do to submit a responsive tender;
- define the risks, liabilities and obligations of the parties to the contract, the procedures for the administration of the contract and how the supplier is to be remunerated in terms of the contract;
- define the nature, quality and quantity of goods, services or disposals or any combination thereof to be provided in the performance of the contract.

Procurement documents should be formatted and compiled in accordance with the provisions of ISO 10845-2 and the following principles:

- the contract data should be drafted clearly and unambiguously and not change the balance of the risks or rewards provided for in the standard form of contract selected for a particular contract;
- the standard forms of contract selected for a particular contract should be used with minimal contract amendments which do not change their intended usage and only be amended when necessary to accommodate special needs;
- the time periods specified in the procurement documents for contract participants to perform their obligations should be of a reasonable duration;
- all formal disputes should be referred to an adjudicator or a dispute avoidance or adjudication board as a condition precedent to arbitration or litigation.

The comprehensive checklists in ISO 10845-2:2020, Annex C should be applied in the development of the scope of work associated with contracts.

6.3.3 The use of procurement as an instrument of policy

6.3.3.1 Approaches

Procurement can be used to promote policy objectives in several ways (see ISO 10845-1:2020, Annex G) or to achieve beyond minimum requirements of the law, such as those relating to health and safety, minimum wages and working conditions, local economic development and skill development. Policy objectives can be implemented through:

- the establishment of requirements in procurement documents;
- measures to increase the likelihood of contracts being awarded to those that satisfy policy objectives;
- incentives to attain or exceed key performance indicators in the performance of a contract.

Requirements can be formulated in terms of prescriptive or performance specifications (see [Annex C](#)). Key performance indicators (KPIs) (measures of impacts or changes that may be beneficial) can be formulated. Such indicators should be formulated in such a manner that they are contractually enforceable. As such they should be described in qualitative terms, linked to measurable and quantifiable targets. Furthermore, they should and be provided with a means of verifying and auditing claims regarding performance in relation to the target (see ISO 10845-1:2020, Annex C and Annex G and ISO 22058).

NOTE 1 Procurement strategy is formulated around procurement objectives which can relate to what must be delivered (primary objectives) or promoted in response to broader societal or organizational aspirations (secondary objectives) through the performance of a contract. Procurement objectives are informed by the client's values and value proposition for the project (see ISO 22058).

NOTE 2 ISO 10845-1 regards secondary procurement policy procurement as policy that promotes objectives additional to those associated with the immediate objective of the procurement itself.

NOTE 3 The targeted procurement procedures set out in ISO 10845-1:2020, Annex G provide a framework within which:

- access to markets can be provided for targeted enterprises and targeted labour;
- incentives can be provided for contractors to satisfy the objectives of an employer's secondary procurement policy in the performance of the contract;
- the participation of targeted enterprises and targeted labour can be secured or promoted in contracts.

6.3.3.2 Incorporating requirement in procurement documents

Requirements can be included in the eligibility criteria in procurement documents (see ISO 10845-1 and ISO 10845-3), the scope of work of a contract (see ISO 10845-1 and ISO 10845-2) or as a condition of contract. Compliance with such requirements can be probed during the evaluation of tender submissions or confirmed

during the performance of the contract to improve enforcement, particularly where legislation is poorly enforced. Failure to satisfy eligibility criteria is a breach of the conditions for the calling for expressions of interest (see ISO 10845-4) or the conditions of tender (see ISO 10845-3) and as such results in the submission being rejected by the evaluators. Failure to comply with the provisions of the scope of work of a contract is a defect or a breach of the conditions of contract.

NOTE 1 Eligibility criteria can be used to introduce minimum qualification or pre-qualification criteria to screen out those who fail to satisfy policy requirements prior to the evaluation of submissions on a compliance or non-compliance basis (see ISO 10845-3).

NOTE 2 Contractors and suppliers can be required, as a contractual obligation, to subcontract a percentage of the work to targeted enterprises or contract goods or services from targeted enterprises. They can also be required to enter into joint ventures with targeted enterprises or engage targeted labour in the performance of a contract. This can most readily be achieved by requiring contractors to achieve a minimum contract-participation goal in accordance with the requirements of ISO 10845-5, ISO 10845-6, ISO 10845-7 or ISO 10845-8. Alternatively, contractors can be required to subcontract identified portions of a contract to targeted enterprises.

6.3.3.3 Measures to increase the award of contracts to those that satisfy policy objectives

The measures to increase the likelihood of contracts being awarded to those that satisfy policy objectives include (see ISO 10845-1 and ISO 22058):

- accelerated rotations on electronic databases which ensure that target groups are accelerated at a faster rate than non-target groups on electronic databases linked to the nominated procurement selection method as provided for in ISO 10845-1 and are therefore provided with more tendering opportunities than non-target groups;
- the granting of a percentage of the total number of evaluation points used to short-list respondents who satisfy requirements or fall into a target group following a call for expressions of interest (see ISO 10845-4);
- the granting of tender evaluation points to tenderers who satisfy requirements or fall into a target group (see ISO 10845-3).

NOTE Confining a market to a narrow group of contractors invariably result in higher prices. The granting of tender evaluation points ensures that any economic rent associated with a market distortion to secure the participation of those who satisfy policy objectives is kept within acceptable limits.

6.3.3.4 Encouraging beyond minimum requirements

The attainment of beyond minimum KPIs can be achieved through:

- the granting of tender evaluation points to tenderers who undertake to achieve a tendered KPI in the performance of the contract;
- an incentive payment being made for the attainment of KPIs in the performance of a contract.

The tendering of KPIs by a tenderer requires tenderers to compete based on not only their financial offer but also on KPIs. This approach enables the market to set the level of the KPI. Incentive payments can be used to encourage contractors to achieve stretch targets.

6.3.4 Standardizing procurement

An organization should standardize procurement processes, methods and procedures for project delivery in a generic and flexible manner which supports and does not frustrate the delivery of projects. This enables those engaged in a range of delivery activities to perform their duties, within the confines of the organization's procurement policy and enables procurement documents to be readily compiled in a uniform and generic manner (see ISO 10845-2). It also enables curricula to be developed to capacitate those engaged in a range of project delivery activities and to readily develop an internal procurement skills base within the organization.

The ISO 10845 series for construction procurement establishes standard procurement processes, procedures and methods. The ISO 10845 series is framed around the following system objectives:

- the procurement system is fair, equitable, transparent, competitive and cost-effective;
- the procurement system may, subject to applicable legislation, promote objectives additional to those associated with the immediate objective of the procurement itself.

Standard forms of contract enable tenderers to take into account the allocation of risks embedded in such contracts when preparing tenders for construction works projects and enables tenders to be evaluated on a comparative basis. There is a range of standard forms of contract with different approaches to managing risks and risk allocations, for example, master-servant relationships or collaboration between two experts, risk sharing or risk transfer, independent or integrated design, short-term relationships based on one-sided gain, or long-term relationships focused on maximizing efficiency and shared value. The choice of a standard form of contract is accordingly a tactical decision and should be informed by the organizational culture.

The client delivery management team should identify the standard forms of contract which are required to deliver the projects for which they are responsible for and develop standard templates for procurement documents. This team should also develop communication templates to facilitate approvals and the administration of contracts.

NOTE The ISO 10845-1 approach is different from that adopted by most multilateral organizations, international agencies and legislators who often deal with goods, services and construction works separately. Typically, different sets of rules, guidelines and regulations are established for these different categories of procurement. This compartmentalized approach can be confusing and makes procurement unnecessarily complex, particularly on projects which require a facility to be delivered in a fully functional state which invariably involves all three categories of procurement. The ISO 10845 series introduces an alternative approach of first developing generic procurement methods which can be used in combination with each other, and thereafter enabling the identification of the methods best suited to categories or types of procurement. Combinations of the generic procedures and methods, with or without eligibility criteria, can be used to simulate the bespoke procurement methods adopted by multilateral organizations, international agencies, and legislators for a particular category of procurement. At the same time, this approach provides organizations with a wide range of options in the pursuit of best-value procurement outcomes.

6.3.5 Contract management

The client delivery management team should ensure that contract managers responsible for applying the terms and conditions of a contract, including the agreed procedures for the administration thereof:

- act as stated in the contract as the agent of the employer, subject to any constraints that may be imposed by the client in terms of the client's policies for procurement and delivery management;
- timeously obtain approvals at procurement gates for taking actions to increase the total of the prices or time for completion when administering contract or order issued in terms of a framework agreement so that the work is not disrupted while approvals are being sought (see ISO10845-1:2020, Annex E);
- promptly provide all information for a contract or order required to populate and maintain registers for governance purposes including:
 - the agreed time for completion or delivery at the start of the contract or order and any changes to such times made in accordance with the provisions of the contract;
 - an initial and a revised cash flow forecast;
 - the agreed and forecasted total of prices;
 - where applicable, the estimated price adjustment for inflation;
 - final delay damages and retention amounts;
- manage the interface between the contractor and those responsible for providing client inputs;
- develop and maintain a contract risk register;

- provide a monthly report on events which, in terms of the contract, cause the total of prices to increase or the contract completion date to be changed;
- report monthly on specific key performance indicators required by a client, funder or in terms of legislation;
- immediately notify the client delivery manager of any health and safety events that impact on the work undertaken in terms of the contract;
- provide the client delivery manager with adequate notice of the anticipated date of completion of a part or the whole of the works so that the necessary handover arrangements with the client or end user can be made;
- make inputs to the close out report, including those relating to cost norms or benchmarks, contractor or supplier performance and the attainment, or not, of project objectives.

The client delivery management team should ensure that contractors develop a completion strategy to minimize the correction of defects after the completion of the works and to achieve completion on or before the completion date. Such a strategy should:

- include a systematic approach to ensuring that employees and subcontractors search for defects as the work progresses, programme their work in such a manner that defects are corrected ahead of completion and sufficient time is allowed for commissioning;
- be framed around the systematic acceptance or testing, or both, of materials, plant, workmanship and subsystems as the works proceed, to address issues ahead of completion and the allocation of tasks to ensure satisfactory completion.

6.4 **Oversee delivery**

6.4.1 **Overview**

The overseeing of project delivery focuses on the system boundaries between the client organization and the project indicated in [Figure 4](#) which is managed by the client delivery management team. It links governance processes to project management processes to ensure that the projects are delivered in the right way and as far as possible achieve the value proposition established for a project.

The client delivery management team, led by a client delivery manager, should oversee delivery. This is achieved through control frameworks, control budgets, managing risks and the impact of change, and the interrogation of data.

6.4.2 **Control framework for project delivery**

Workflow may be regarded as the sequence of activities with explicit start and end points to describe a task. An activity as a series of operations is punctuated by decisions. For a construction works project to progress meaningfully, its objectives and their achievement should be closely allied to the decision structure. Decisions give purpose to activity and commit resources. A project begins and ends with decision points. Decision points (controls or decision gates) form the major boundaries to activities. Decision gates provide an opportunity to:

- authorize the proceeding with an activity within a stage (collection of logically related activities in the delivery cycle) or the commencing of the next stage;
- confirm conformity with what was planned before completing a stage; or
- provide information which creates an opportunity for corrective actions to be taken.

Control systems are necessary to regulate work in relation to its context which from time to time can change to match performance against objectives. Such systems are also the mechanism that deals with the boundary between project context and project activity. Accordingly, control systems involve the comparing

of progress against requirements, objectives or targets and where necessary taking some corrective actions such as:

- taking steps to change the performance of the activity to bring it closer to what was planned;
- changing the plan so that it more closely reflects the changed situation brought about by the departure from the plan.

The client delivery management team should ensure that a control framework is put in place, based on the workflow associated with the planning, design and execution of construction works projects, broken down into stages that culminates in the completion of a major deliverable such as that indicated in [Annex B](#). Decision gates should be linked to the end of stages. The client organization should clearly delegate responsibility for pronouncing on the acceptability or otherwise of the end of stage deliverables. This team should also capture the decisions made in a suitable document management system.

6.4.3 Control budgets

The client delivery management team should manage the impact of change to ensure the outcomes of the project are in line with expectations. The client delivery management team should accurately track estimated final costs and ensure that projects are delivered within authorized amounts and where projects are delivered against an annual budget, the annual budget that is allocated is not exceeded or significantly unspent.

The client delivery management team should establish a control budget for each project, element and construction works package. Control budgets are concerned with the estimation of the total outturn costs (the actual, total cost calculated at the end of the project) which can include professional fees, taxes, land costs, furniture, fittings and equipment, and information and communication technology systems, etc. Control budgets in the early phases of the project or element thereof should be based on cost norms or historic data or bottom-up estimates of the major components. The control budget should include allowances for price adjustment for inflation and, if applicable, currency fluctuations over the anticipated duration of the project and work which cannot be foreseen or predicted with certainty (contingency amounts).

Preliminary control budgets should be established at the time that a strategic brief (see [Annex B](#)) is developed to brief the professional team on the cost expectations for the project. Such a budget can be finalized following the receipt of a concept report (see [Annex B](#)) which establishes the technical viability of the project when the scope is frozen (see [Annex B](#)). Thereafter the delivery of the construction works projects should be managed within this control budget which may, be adjusted with the approval of the client organization's governing body or delegated persons.

Separate control budgets should be set for each construction works work package with the objective that:

- the delivery of the individual work packages is within the authorized project amount;
- work packages identified in the project delivery management plan for a financial year are within the cumulative budget allocated for the financial year under consideration, enabling some flexibility in managing projects against an aggregate budget within a financial year.

The surplus or deficit can be established as the difference between the authorized amount (amount available for planning, design, implementation, etc.) and the sum of the control budget. Control budgets provide a means for managing costs within an authorized project amount. They also alert the client delivery management team to increases above the authorized amount enabling the plan to be changed to fit within the budget or to obtain timeous approval for increases in the authorized project amount.

Control budgets enable the client delivery management team to task the design team to complete the outstanding work as far as possible within the control budget set for a work package. Where design solutions during the detailed design stage and production information stage resulted in cost increases, savings or trade-offs can be sought elsewhere to bring the total of the prices back to within the agreed control budget. This changes the culture from "payment for work done" or "pay for what is designed" to "delivering a project within a budget."

Control budgets should be realistic and robust.

6.4.4 Achieving outcomes

The delivery of construction works projects frequently has several interfaces and interdependencies between contracts within a supply chain that is mobilized to deliver a project or an element thereof. The outcome of delivery is construction works capable of being occupied or used as a functional entity. Accordingly, projects may be incomplete or not fully functional if furniture, fittings and equipment, information and communication technology networks, training etc. are not integrated into the works. The physical works may be complete but may not be capable of being occupied or used as a functional entity.

The client delivery management team should observe and define the execution of the project to realize the client's value proposition associated with a business case. This team should:

- focus on the user outcomes specified for the project to ensure that work packages are designed and delivered to progressively realize the client's outcomes for a project;
- be mindful of the impact on project outcomes of slippages or changes in interconnecting parts of the works;
- establish, where necessary, integration committees to see that that completed construction works function as intended.

6.4.5 Data gathering

Accurate and up-to-date project record-keeping is required to keep track of project expenditure and to ensure informed and timely decision making on any course corrections. The client delivery management team should gather and analyse data on progress and costs. Such data should enable the control budget to be monitored and any course correction to be made sooner rather than later.

6.4.6 Reporting to governance structures

Feedback is a critical part of successful communication and is equally important in ensuring the successful implementation of projects. Proper feedback on projects ensures that all the role players are fully aware of everything taking place and can take any corrective action that may be required (see ISO 21502).

Project delivery management plans (see [6.1.5](#)) if updated and approved by the governing body prior to the start of a financial year, contain information on projects which are to be executed over a medium-term horizon. Well formulated annual implementation plans (see [6.1.7](#)), based on these implementation plans, enable a baseline for performance to be established and quarterly dashboard reporting to be made.

The control budget and schedule information should be incorporated into a simple graphical format such as a high-level Gantt chart to create a high-level multi-year implementation plan for a programme of projects. This dash-board presentation enables senior managers, the project delivery steering committees and the governing body to understand what is planned for several financial years and to monitor progress against quarterly reports and updates. This enables risks which pose a serious threat to project objectives to be reported on.

6.4.7 Interrogation of information

The client delivery management team should review, on at least a monthly basis project timelines, budgets and cash flows and should carefully monitor any potential deviations and the effect of corrective actions. Of particular importance is the estimate of expenditure in the current financial year, and the total project or project element cost.

Care should be taken that a reduction in scope to bring expenditure within budget does not create wasteful or unnecessary future expenditure.

The client delivery management team should continuously monitor the status of project contingencies as the provision of contingencies ties up a portion of the annual budget for something that may not occur. Unused contingencies should be reduced as the work progresses to reduce the risk of underspending capital budgets.

6.4.8 Managing project risks and change

Risk, the impact of uncertainty on project objectives, should be identified, recorded and mitigated. The client project delivery team should inculcate an interventionist risk management culture within the client organization in all phases of the project. The client delivery manager should table such risks at the meetings with the project delivery steering committee and, if necessary, the governing body.

Change is any deviation from the way work was planned, designed, budgeted or scheduled. It can arise from design changes, scope of work changes, delays in finalizing or issuing production information, unforeseen site conditions, regulatory changes, inadequate specifications or production information, schedule changes and subcontractor performance. These changes often result from evolving circumstances and requirements. The client delivery management team should manage such changes and ensure that significant changes are timeously approved by client organization structures.

The client delivery management team should manage the impact of change to ensure the outcomes of the project are in line with expectations. The absence of diligent and timeous implementation of change management can have dire consequences, resulting in cost and schedule overruns, lost profits and ruined relationships.

Changes late in the project should be avoided as far as possible.

NOTE 1 Change can be either positive or negative. Positive change comes about when it enhances the project outcomes or rectifies circumstances that would otherwise harm a project. Negative change results in project overruns and associated impacts.

NOTE 2 There are two fundamental categories of the impact of change, namely direct impacts (the direct cost of implementing or accommodating a change) and secondary impacts (disruption, cumulative impact, ripple effects, etc.). The secondary impacts relate to the additional cost of performing work which is not directly changed. This is the added cost due to lowered productivity or increased rework on the unchanged work. These impacts arise due to out-of-sequence working, engineering rework, reduced productivity, hiring new staff with the requisite qualifications or experience to recover the programme time lost, increased overtime, night shifts, management or oversight stretch and attention span, workforce morale, out-of-sequence flow of information to vendors, partners, etc. The secondary impacts of change can have a far greater impact on the project than the direct impacts of change. This is since they grow disproportionately over more and more changes. Furthermore, they can appear sometime after the incident change event has occurred. Variations in project conditions drive different secondary impacts. Early resolution can cut their impact significantly. Secondary impacts are significantly reduced by less tight project schedules.

6.4.9 Commissioning

Commissioning is a quality-oriented process for achieving, verifying, and documenting that the performance of facilities, systems, and assemblies meets defined objectives and criteria. Commissioning is often misinterpreted to focus solely on testing during the end of the construction phase. Commissioning is a collaborative process for planning, delivering, and operating works that function as intended. Commissioning is a holistic process that spans from pre-design planning to post-construction operation and can be thought of as a checks-and-balances system.

The client delivery management team should schedule commissioning procedures in relation to other services or construction activities. Since the commissioning process is dependent on the progress of systems, structures and building fabric, the scheduling of commissioning activities should be carefully planned in relation to those activities. Accordingly, the interdependency problems should be identified and considered as early in the project as possible as they should be included in the designer's specification. Comprehensive commissioning requirements should be established in the scope of work associated with contracts.

6.4.10 Standardization

Standardization in procurement documentation, designs, specifications, procurement, pricing, contracting and targeting strategies within a particular programme can bring about significant efficiencies in the time and cost of the delivery of projects. Standardization can also result in improvements to project outcomes measured by quality and end-user satisfaction. Such standardization not only significantly reduces the internal and external professional inputs required to deliver projects but also affords contractors the opportunity to be more productive and profitable.

The client delivery management team should identify aspects of a project or programme of projects which can be standardized and ensure that such aspects are standardized in the delivery process.

6.4.11 Data capture and disclosure

Data capture should be designed around one or more of the objectives and priorities such as:

- tracking and improving value for money in procurement;
- measuring and increasing competition for contracts;
- helping the organization to understand what it buys and how;
- promoting integrity by monitoring for 'red flags' of corruption;
- increasing participation of marginalized target groups;
- enhancing service delivery by tracking quality, delivery and milestones in contracts.

Data capture should be linked to:

- a suitable item classification scheme which enables procurement activities to be readily related to a procurement sector;
- key points within the procurement cycle (see [Figure 2](#)) and workflow associated with the delivery of construction works projects (see [Annex B](#)).

Data should be captured in a standard format and located in a single location.

Consideration should be given as to which data should be proactively disclosed without the need for any requests for information and which data should be reactively disclosed following a request for information.

NOTE 1 ISO 10845-3 and ISO 10845-4 provide a standard format for evaluation reports.

NOTE 2 According to the Open Contracting Partnership, open contracting is an approach to open up and reimagine public procurement by promoting transparency, collaboration, and achieving results. It is about:

- publishing and using open, accessible and timely information on public contracting to engage citizens and businesses to fix problems and deliver results including the improving of the efficiency, effectiveness and integrity of a public contracting system;
- open data that can be freely used, modified, and shared by anyone for any purpose which is accessible and machine-readable;
- a data standard which defines the structure and meaning of data in order to resolve ambiguity and help systems and people interpret it.

NOTE 3 CoST - the Infrastructure Transparency Initiative seeks to improve performance in the procurement of public infrastructure by identifying, highlighting and helping to address the risks of inefficiency, mismanagement and corruption. The four features of CoST are:

- disclosure: the publication of data at key stages throughout the entire project life cycle;
- assurance: the independent review of disclosed data;
- multi-stakeholder working: the bringing together of government, the private sector and civil society to pursue the common goal of improving transparency and accountability in public infrastructure;
- social accountability: ensuring that the disclosed data and assurance reports are taken up and used by stakeholders.

6.4.12 Exit strategies

Projects are by their very nature temporary and must be closed out when completed. This can involve the confirming of the completion of the project's scope, the noting of any activities not completed, particularly in the case of termination, the enabling of post-projects benefit realization, and the managing

of the demobilization of any remaining resources and facilities (see ISO 21502). Accordingly, the design and execution of the client delivery management arrangements should consider the demobilizing of resources and facilities post-completion. The final disengagement from a project should guide the management of each participant's involvement so that they can steer the project in the direction that their successful disengagement demands. When setting up a project or programme it is essential to consider how each participant's involvement ends.

Contracts have a start and an end date. They too must be closed out when the contract obligations of the parties are met, or when the contract is closed early for whatever reason in accordance with the provisions of the contract. When termination provisions are enacted, measures to minimize the costs associated with the impact of the termination should be considered. The impact of termination on interfaces and dependencies with other contracts also should be considered and mitigated.

The client delivery manager can be called upon to take corrective actions relating to;

- delays in funding;
- a project becoming unviable for whatever reason;
- unforeseeable and unavoidable events such as pandemics or social unrest which prevent participants from fulfilling their obligations, possibly for extended periods of time.

Corrective actions or premature exits invariably have contractual implications. Decisive and swift decisions should be taken. Procrastination can lead to escalating or spiralling costs. Accordingly, the client delivery management team should consider exit strategies in the formulation of contracting strategies and tactics (see ISO 22058) and what the options are in contracts that are entered. For example, delivering a project incrementally using framework agreements in accordance with the provisions of ISO 10845-1 enables cost risks to be contained as the client only commits to a discrete portion of a project at each point.

Annex A (informative)

Core systems for the delivery of construction works projects

A.1 General

Project delivery is intrinsically linked to four core systems, namely a planning and budgeting system, an asset management system, a delivery management system and a procurement system. [Figure A.1](#) indicates the workflows (sequence of activities with explicit start and end points) associated with the planning and budgeting system, asset management system and delivery management system and their forward and backward linkages. [Figure A.2](#) indicates a common workflow associated with these core systems (see ISO 10845-1), highlighting the delivery management stages and controls (see [Annex B](#)). Procurement takes place whenever resources are required. [Figure A.2](#) indicates the key procurement activities and controls described in ISO 10845-1.

In practice, the boundaries at the interfaces between systems are not that clear and may be blurred. Organizations can allocate tasks within different systems to different units within their organization, depending upon where staff capabilities and capacity lie. Nevertheless, the activities associated with the tasks within all the systems must be performed.

NOTE 1 [Figure A.1](#) is premised on the client owning and maintaining a portfolio of construction works which funds project delivery on an ongoing annual basis. Where business cases are developed in stages for a project, Stages P1, P2 and some of the Stages 1 to 4 can be omitted.

NOTE 2 Procurement Gates 1 and 2 in [Figure A.2](#) can be omitted if procurement strategies are approved at gate 2 of the project delivery management system (see [Figure A.1](#)).

A.2 Asset management system

Asset management considers the entire lifecycle (service life) of the asset and the associated costs, from the identification of a need to the final decommissioning of the asset. It is a strategic approach to project delivery that provides direction on decision making throughout the associated planning, delivery, operation and disposal processes. It follows a risk-based approach in all asset management decisions in order to achieve a balance between cost, risk and performance.

An asset management system, which feeds into the demand management component of a delivery management system, comprises several activities which can be grouped together into six basic sets of tasks or components as indicated in [Figure A.1](#), namely:

- asset register;
- asset management policy and levels of service;
- condition assessment;
- service life planning;
- critical construction works needs;
- delivery process inputs.

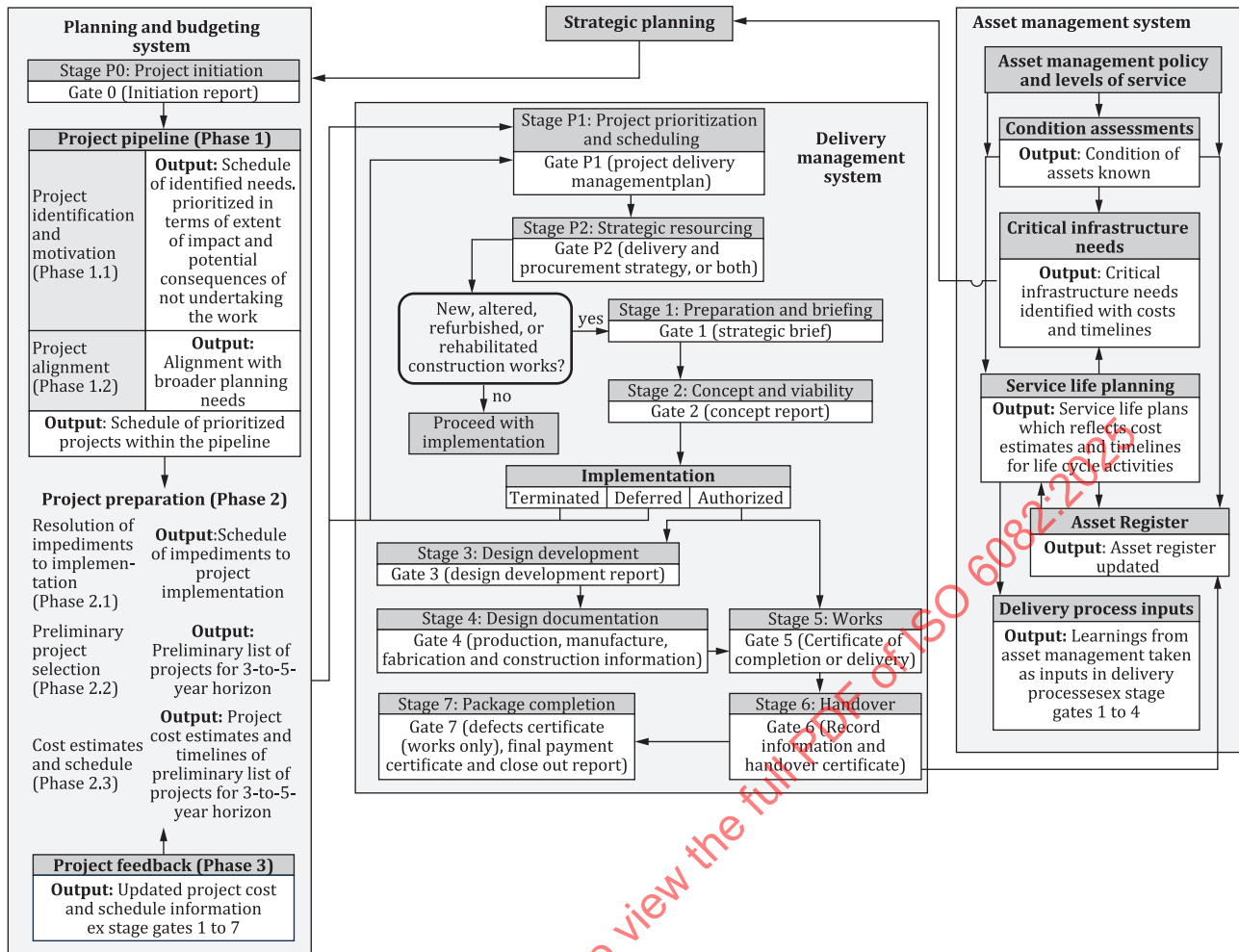


Figure A.1 — Linkages between core systems

Legend:

PG = procurement gate

FG = framework agreement gate

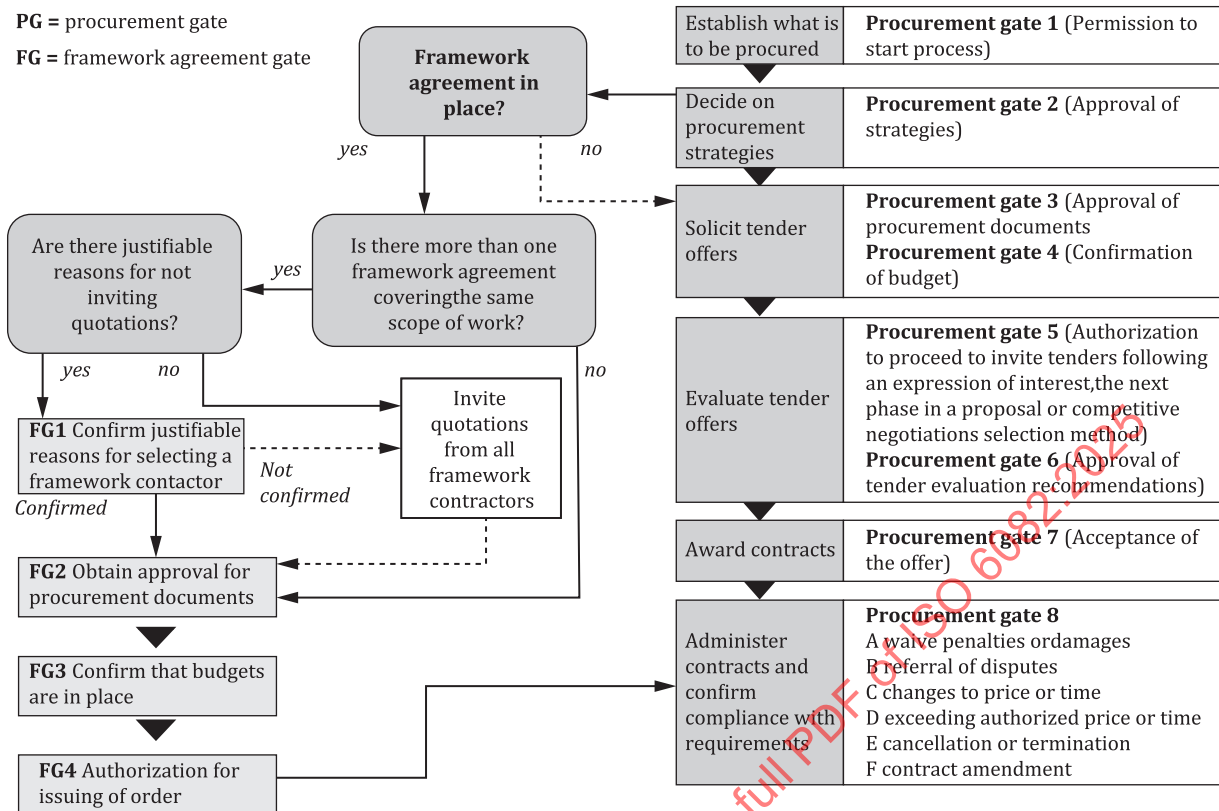


Figure A.2 — Procurement system and controls (see ISO 10845-1:2020, Annex E)

An asset management policy and levels of service should broadly outline the principles, legislative and environmental requirements, and should establish responsibilities and levels of service in terms of attributes such as quality, reliability and responsiveness, and performance measures used to demonstrate performance in delivering levels of service. All assets should be identified and have their performance measured against the yardstick of an acceptable level of service. Knowledge of the condition and remaining useful life of an asset is a key part of understanding the future requirements for rehabilitation, replacement, or disposal. This informs financial decision making. Levels of service and future demand cannot be looked at in isolation from each other. Future demand not only informs what budgets will be required over time, but also gives an indication about whether the current levels of service are sustainable. Future demand is a key input into strategic planning decisions.

Critical and important assets can be identified by considering the consequences of failure in terms of health and safety incidents, additional costs of deferring repairs and maintenance, impact on the business and image of the organization and the effect on the environment. Any critical maintenance work identified should then be fed into the planning and budgeting process to be prioritized together with any proposed new capital work. There should also be alignment between those who design and construct construction works with those who subsequently use or manage construction works.

One of the major starting points for asset management is the identification of all existing assets. This can be developed incrementally, based on the level of accuracy required versus affordability, and should precede finalization of an asset management policy. In addition to identifying assets, it is important to determine an acceptable level of service, so that the asset performance can be measured against a set yardstick. Levels of service are informed by a combination of customer needs, legislative requirements and internal business objectives, and should be sustainable over the service life of the asset.

A.3 Planning and budgeting system

A planning and budgeting system for construction works projects comprises several activities which can be grouped together into 3 basic sets of tasks or components, namely, project pipeline, project preparation and project feedback as indicated in [Figure A.1](#).

Construction works projects or critical requirements, in the first instance, should be identified during strategic planning processes within the asset management system. Thereafter, such projects should be motivated by considering the benefit of the project, the consequences of not undertaking the project, or both. Decisions relating to initiating and implementing construction works projects should be based on a business case which addresses the business needs that the project seeks to meet, and alignment with broader planning and strategic considerations, including spatial planning strategies.

The initiation report formalizes the admission of a project into a pipeline of projects (Stage P0 deliverable) so that it can be further prepared and prioritized on a risk-based approach prior to a decision being taken to progress the project to implementation. Project preparation is required to identify any impediments to implementation such as those relating to land (e.g. third-party rights such as easements, servitudes or wayleaves, ownership, zoning), and environmental and other legislative approvals. Costs and timelines should be refined to ensure that budget estimates are realistic, and the timelines included in project delivery management plans are achievable. The project pipeline includes projects ranging from an identified need to those that have been developed and are ready to implement.

Once the project pipeline has been established and prioritized, alignment with broader and strategic planning processes should be confirmed and impediments to implementation identified. Although the project pipeline will contain high level estimates and project timelines, projects that fall within the preliminary selection for a project delivery management plan should have more detailed timelines and estimates to ensure that the budget estimates are realistic, and the timelines are achievable. This project preparation stage is a critical phase of the planning process. The likelihood of implementing proposed projects within the proposed budgets and schedule put forward in any project delivery management plan must be understood.

Proper feedback on projects ensures that all the role players are fully aware of everything taking place and can take any corrective action that may be required. Such feedback informs future decisions and choices, leading to ongoing improvement in planning and budgeting including improved project estimates, particularly where projects straddle several financial years.

A.4 Delivery management system

The workflow associated with the planning, design and execution of construction works is broken down into stages (collections of logically related activities in the delivery cycle) that culminate in the completion of a major deliverable as indicated in [Figure A.1](#) and expanded upon in [Annex B](#). Each of these stages is linked to tasks which the supply chain is required to deliver. Decisions should be taken on the acceptability of each end of stage deliverable. The stages are structured in such that the viability of a project may be tested and monitored and controlled by the client delivery management team (those assigned to perform the buying function) as it progresses.

Project delivery management plans developed during Stage P1 (project prioritization and scheduling) enable an organization to prioritize projects admitted to the pipeline of projects, typically over a three-to-five-year horizon. This ensures that projects are aligned with strategic objectives and enables decisions on how projects are to be financed prior to a decision being taken to further progress them. The procurement and delivery management strategy developed during Stage P2 (strategic resourcing) outlines how the resources required to perform both the buying and supply function are to be assembled to implement each project.

Stage 1 (preparation and briefing) establishes a strategic brief for the project to enable professionals to advance the project. Stage 2 (concept and viability) results in a solution for the project which satisfies the strategic brief, and which enables the technical, environmental and economic feasibility of a project to be confirmed. Stage 3 (detailed design), if required, includes the selection of materials and components. The design development report translates the concept report into a document which defines what is to be delivered. Record information provided in Stage 6 relates to what has been delivered.

Production information and, if necessary, manufacture, fabrication and construction information, are developed during Stage 4 (design documentation) enabling construction or supply and installation during Stage 5 (works). Upon completion of Stage 5, the works are handed over together with record information to the end user or those responsible for the operation and maintenance of the works (Stage 6). Stage 7 (close out) closes out not only the contractual provisions between the buyer and the supplier but also the project.

A.5 Procurement system

The establishment of what is to be procured (Activity 1) initiates the procurement process (see [Figure A.2](#)). Procurement strategy (Activity 2) is all about the choices made in determining which of the required goods and services or combinations thereof are to be delivered through a particular contract, the contracting arrangements, how procurement is to be used to promote secondary procurement objectives, if any, and the selection methods used to solicit tender offers (see ISO 22058). Conditions for the calling for expressions of interest to prequalify respondents to participate in a specific contract, project or programme (see ISO 10845-4), and conditions of tender (see ISO 10845-3) govern Activities 3 to 5. Conditions of contract govern Activity 6.

Framework agreements, unlike term service contracts, have no value when they are awarded (see ISO 10845-1). The framework agreement gates indicated in [Figure A.2](#) enable orders to be prepared, expenditure to be authorized, and orders against a framework agreement to be issued.

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