ICMS INTERNATIONAL CONSTRUCTION MEASUREMENT STANDARDS

ICMS: Global Consistency in Presenting Construction and Other Life Cycle Costs

2nd edition

ICMS Coalition

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Welcome to ICMS, 2nd edition

Life cycle costs (LCC) play a pivotal role in the financial management of construction projects around the world. As a part of the whole life cost (WLC), they allow critical decisions to be made about the importance of capital and longer-term costs that ultimately affect asset performance, longevity, disaster resilience and sustainability. It is for this reason that the ICMS Coalition has revised and extended the scope of International Construction Measurement Standards (ICMS) to incorporate this broader cost classification. This new edition supersedes the first edition of ICMS (July 2017) although this second edition can still be used solely for capital cost reporting.

Since its inception, the driving principle behind ICMS has been that consistent practice in presenting construction costs globally will bring significant benefits to construction cost management. As such ICMS aim to provide global consistency in classifying, defining, measuring, recording, analysing, presenting and comparing entire life cycle costs of construction projects at regional, state, national or international level. ICMS are a high-level cost classification system. The globalisation of the construction business has only increased the need to make this meaningful comparative analysis between countries, not least by international organisations such as the World Bank Group, the International Monetary Fund, various regional development banks, non-governmental organisations and the United Nations.

Since their introduction to the market in 2017, ICMS have already been adopted by a number of high-profile bodies seeking to benchmark project costs internationally. To date this includes large public sector project sponsors, global cost consultancies, constructors, and other construction sector stakeholders (for a list of business support partners visit https://icms-coalition.org/).

ICMS have been created through a transparent, detailed and inclusive standards-setting process. The second edition has followed the same development method as the first. A second independent Standards Setting Committee (the SSC) was formed, including experts in life cycle costing as well as some of the experts who developed the first edition. The SSC worked virtually and met twice, once in Dubai and once in London.

It is accepted that standards-setting is a continuous and dynamic process. The SSC will be listening carefully to the global construction cost management community to ensure necessary updates are captured for continued improvement.

Many key stakeholders are being engaged in the process of implementation. A list of ICMS-supporting partners is shown on the ICMS Coalition website (https://icms-coalition.org/) – these organisations are committed to the adoption of ICMS.

For further information on ICMS, please visit the Coalition website.

On behalf of the ICMS Coalition Trustees:

Ken Creighton – (Royal Institution of Chartered Surveyors) – Chair

Craig Bye – (Canadian Institute of Quantity Surveyors) – Vice Chair

Julie de la Cruz – (Philippine Institute of Certified Quantity Surveyors) – General Secretary.

ICMS Coalition

The Coalition is a non-governmental, not-for-profit professional coalition. A wide range of professional organisations are represented in the Coalition and the SSC. They were generous in providing their national standards, which again provided the basis for the early deliberations of the SSC. The Coalition originally formed on 17 June 2015 at the International Monetary Fund in Washington DC, USA. The Coalition aims to bring about consistency in construction project cost reporting standards internationally through the development and adoption of ICMS.

The Coalition members for the second edition are:

Africa Association of Quantity Surveyors (AAQS)

Association for the Advancement of Cost Engineering International (AACE)

Association of Cost Engineers (ACostE)

Association of South African Quantity Surveyors (ASAQS)

Australian Institute of Quantity Surveyors (AIQS)

Brazilian Institute of Cost Engineers (IBEC)

Building Surveyors Institute of Japan (BSIJ)

Canadian Association of Consulting Quantity Surveyors (CACQS)

Canadian Institute of Quantity Surveyors (CIQS)

Chartered Institute of Building (CIOB)

Chartered Institution of Civil Engineering Surveyors (ICES)

China Electricity Council (CEC)

China Engineering Cost Association (CECA)

Commonwealth Association of Surveying and Land Economy (CASLE)

Conseil Européen des Economistes de la Construction (CEEC)

Consejo General de la Arquitectura Técnica de España (CGATE)

Dutch Association of Quantity Surveyors (NVBK)

European Federation of Engineering Consultancy Associations (EFCA)

Fédération Internationale des Géomètres (FIG)

Fiji Institute of Quantity Surveyors (FIQS)

Ghana Institution of Surveyors (GhIS)

Hong Kong Institute of Surveyors (HKIS)

Ikatan Quantity Surveyor Indonesia (IQSI)

Indian Institute of Quantity Surveyors (IIQS)

Institute of Engineering and Technology (IET)

Institute of Quantity Surveyors of Kenya (IQSK)

Institute of Quantity Surveyors Sri Lanka (IQSSL)

Institution of Civil Engineers (ICE)

Institution of Surveyors of Kenya (ISK)

Institution of Surveyors of Uganda (ISU)

International Cost Engineering Council (ICEC)

Italian Association for Total Cost Management (AICE)

Korean Institution of Quantity Surveyors (KIQS)

Fachverein für Management und Ökonomie im Bauwesen (maneco)

New Zealand Institute of Quantity Surveyors (NZIQS)

Nigerian Institute of Quantity Surveyors (NIQS)

Pacific Association of Quantity Surveyors (PAQS)

Philippine Institute of Certified Quantity Surveyors (PICQS)

Property Institute of New Zealand (PINZ)

Real Estate Institute of Botswana (REIB)

Royal Institute of British Architects (RIBA)

Royal Institution of Chartered Surveyors (RICS)

Royal Institution of Surveyors Malaysia (RISM)

Singapore Institute of Building Limited (SIBL)

Singapore Institute of Surveyors and Valuers (SISV)

Sociedad Mexicana de Ingeniería Económica, Financiera y de Costos (SMIEFC)

Society of Chartered Surveyors Ireland (SCSI)

Union Nationale des Economistes de la Construction (UNTEC).

ICMS Standards Setting Committee

The Standards Setting Committee (SSC) comprises experts selected by the Coalition and representing a wide range of professional construction organisations in the built environment. The SSC acts independently from the Coalition and its members.

The SSC members and co-authors of ICMS, 1st edition (July 2017) are:

Ong See-Lian (Malaysia)	Chairman
Alan Muse (UK)	Vice-Chairman
Gerard O'Sullivan (Republic of Ireland)	Executive Secretary

Alexander Aronsohn (UK)
Dainna Baharuddin (Malaysia)
Tolis Chatzisymeon (Greece)
William Damot (Philippines)
Ruya Fadason (Nigeria)
Roger Flanagan (UK)
Mark Gardin (Canada)
Malcolm Horner (UK)
Roy Howes (Canada)
Guo Jing Juan (China)
Philip Larson (USA)
Patrick Manu (Ghana)
Charles Mitchell (Republic of Ireland)
Sinimol Noushad (UAE)
Antonio Paparella (Belgium)
David Picken (Australia)
Anil Sawhney (India)
Peter Schwanethal (UK)
Koji Tanaka (Japan)
Tang Ki-Cheung (Hong Kong).

In January 2018, the SSC started drafting the second edition to incorporate other life cycle costs. Experts in life cycle costing, therefore, joined the SSC.

The SSC members and co-authors of the second edition are:

Ong See-Lian (Malaysia)	Chairman
Alan Muse (UK)	Vice-Chairman
Gerard O'Sullivan (Republic of Ireland)	Executive Secretary

Alexander Aronsohn (UK)
Dainna Baharuddin (Malaysia)
Tolis Chatzisymeon (Greece)
Ruya Fadason (Nigeria)
Andrew Green (UK)
Malcolm Horner (UK)
Roy Howes (Canada)
Francis Leung (Hong Kong)
Patrick Manu (Ghana)
Brian McBurney (Canada)
Charles Mitchell (Republic of Ireland)
Sinimol Noushad (UAE)
Antonio Paparella (Belgium)
David Picken (Australia)
Anil Sawhney (USA)
Koji Tanaka (Japan)
Tang Ki-Cheung (Hong Kong)
Luizviminda Villacan (Philippines).

Part 1 Context

1.1 Introduction

Research from the World Economic Forum has shown that improvements in the design and construction process can be achieved by using international standards like ICMS to gain comparable and consistent data. ICMS provide a high-level structure and format for classifying, defining, measuring, recording, analysing and presenting construction and other life cycle costs. This will promote consistency and transparency across international boundaries. The ICMS have focused only on issues directly related to the costs associated with the constructed asset so that cross-boundary costs can be benchmarked and the causes of differences in costs identified.

The ICMS project followed work on the development of International Property Measurement Standards (IPMS). IPMS established standards for measuring the floor areas of buildings. For ICMS, a key element was that ICMS would be compatible and accord with IPMS.

ICMS offer a high-level framework against which construction costs and other life cycle costs can be classified, defined, measured, recorded, analysed, presented and compared. The hierarchical framework has four levels:

- Level 1: Project or Sub-Project
- Level 2: Cost Category
- Level 3: Cost Group
- Level 4: Cost Sub-Group.

The composition of Levels 2 and 3 is the same for all Projects and Sub-Projects, although discretion is allowed at Level 4. Examples of the contents of Level 4 are given in Appendices A to E.

ICMS provide definitions, scope, attributes and values, units of measurement and explanatory notes for each type of Project. Guidance is given on:

- how the Standards are to be used
- the level of detail to be included while presenting costs
- the method of dealing with Projects comprising different Sub-Projects, and
- the approach for ensuring that like is compared with like, especially considering different currencies and timeframes.

For buildings, the existing cost analysis standards worldwide require the measurement of either the Gross External Floor Area (GEFA) or Gross Internal Floor Area (GIFA). This permits the representation of overall costs in terms of currency per GEFA or GIFA. Research shows that floor area measurement standards vary considerably between countries. The linking of ICMS with IPMS provides a valuable tool for overcoming these inconsistencies. ICMS require a cost report to include both GEFA (IPMS 1 (EXTERNAL)) and GIFA (IPMS 2 (INTERNAL)) measured in accordance with the rules set out in IPMS. These are summarised in Appendix I.

For selected types of civil engineering projects, ICMS also provide units of measurement describing their physical sizes and functional capacities for comparison. The second edition extends the number of civil engineering Projects or Sub-Projects to include ‘Dams and reservoirs’, and ‘Mines and quarries’.

ICMS are high-level standards. The transparent and inclusive standards-setting process described has resulted in full analysis and appreciation of standards and practices in many more countries than those directly represented by SSC members. ICMS are not a hybrid of those standards but do introduce some concepts that may be new to some markets. Markets that do not have established standards are, however, encouraged to adopt ICMS. Markets that do have established local standards should adopt ICMS to compare cost data prepared using different standards from different markets on a consistent, like-for-like basis. The aim is not to replace existing local standards, but to provide an internationally accepted reporting framework into which data generated locally can be mapped and analysed for comparison. In time, it is expected that ICMS will become the primary basis for both global and local construction cost reporting.

In drafting ICMS, the SSC has been conscious of the need for compatibility with other established or emerging standards. It has aimed to strike a balance between the need to be compatible with different standards and the need for flexibility to accommodate detailed cost classification systems that exist across the world.

Thus, the types of Project are generally compatible with the United Nations *International Standard Industrial Classification of all Economic Activities*. The Cost Sub-Groups are generally compatible with the elements in ISO 12006-2:2015, *Building construction – Organization of information about construction works – Part 2: Framework for classification* and can be adapted to be compatible with most other cost classification systems. The Cost Groups and Cost Sub-Groups for Life Cycle Costs are generally compatible with ISO 15686-5:2017 *Buildings and constructed assets – Service life planning – Part 5: Life-cycle costing*.

In addition, it has been recognised that a work breakdown structure (WBS) approach to cost reporting is widely used around the world, particularly in civil engineering projects. Therefore, examples of mapping to and from various national standards and WBS are included on the Coalition website (https://icms-coalition.org/).

As the use of Building Information Modelling (BIM) becomes more widespread, the link between BIM and ICMS takes greater importance. ICMS may be used as the cost breakdown structure in BIM-based cost management practice.

Part 4 provides definitions of terms commonly used throughout the Standards. Definitions specific to particular types of Projects are provided in Appendices A to E.

1.2 Aims

ICMS aim to provide global consistency in classifying, defining, measuring, recording, analysing and presenting entire construction and other life cycle costs at a project, regional, state, national or international level. ICMS allow:

- construction and other life cycle costs to be consistently and transparently benchmarked (comparative benchmarking)
- the causes of differences in life cycle costs between projects to be identified (option appraisal)
- properly informed decisions on the design and location of construction projects to be made at the best value for money (investment decision making) and
- data to be used with confidence for construction project financing and investment, decision-making, and related purposes (certainty).

1.3 Use of the Standards

The second edition of ICMS can be used to present Acquisition Costs, Construction Costs, Renewal Costs, Operation Costs, Maintenance Costs, and End of Life Costs using the template provided in Appendix G. Those interested in simply presenting the Construction Costs can use the templates entitled 'Construction Costs only'.

Wherever a cost report has been prepared in compliance with ICMS, this should be stated in the report.

ICMS can be used to classify, define, measure, record, analyse, present, and compare historical, current and future construction and other life cycle costs of new build and Major Adaptation programmes and projects. This can be applied throughout the various stages of construction and/or after completion of construction through to the end of life or a shorter Period of Analysis.

Applications include, but are not limited to:

- global investment decisions
- international, national, regional or state cost comparisons
- feasibility studies and development appraisals
- project work including cost planning and control, cost analysis, cost modelling and the procurement and analysis of tenders
- dispute resolution work
- reinstatement costs for insurance, and
- valuation of assets and liabilities.

Process flow charts set out the comprehensive steps for the use of the Standards and are provided in Appendix F.

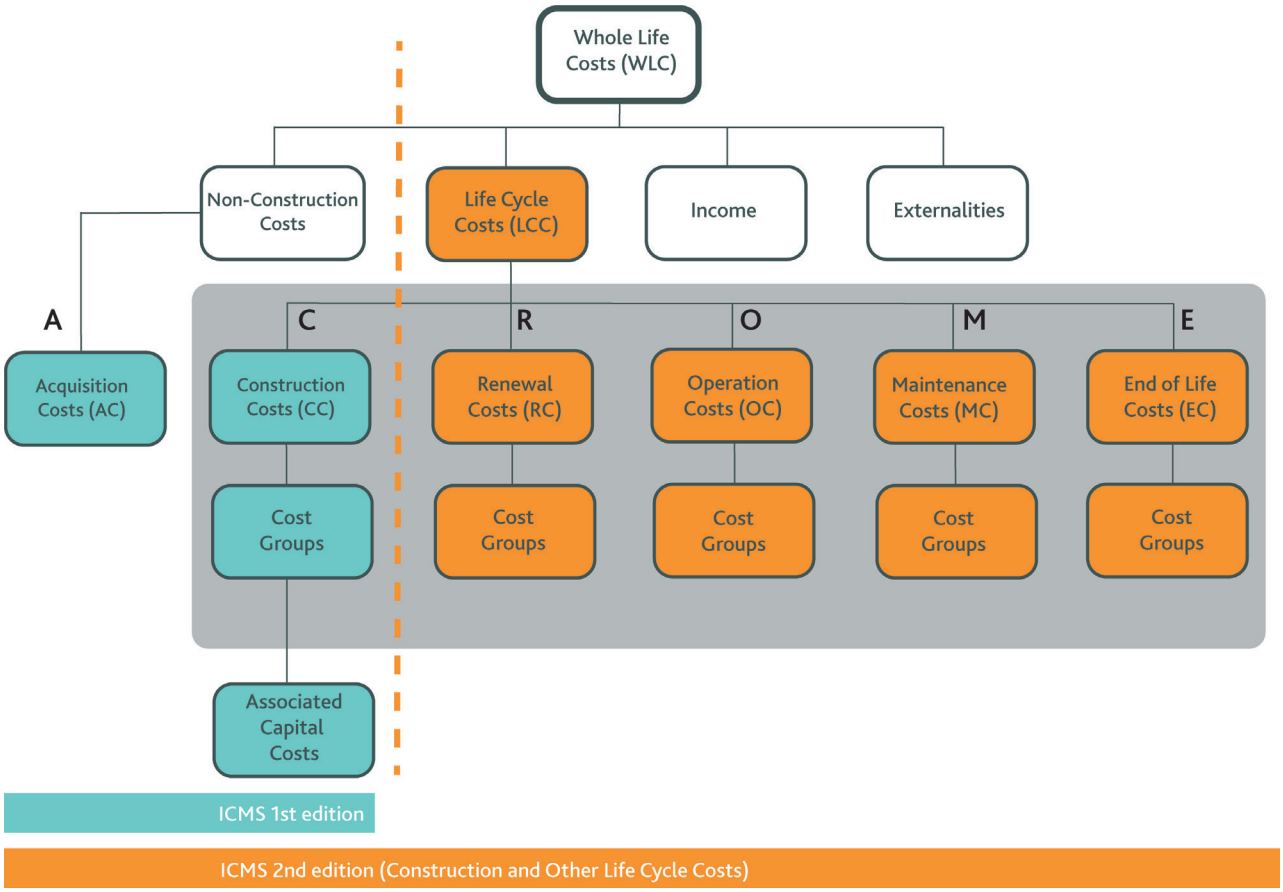
The cost report should make clear precisely what costs have been included or excluded, to avoid confusion or omissions in comparing alternative project options and to inform decision making. The most appropriate available data sources should be used. These may be in the public domain or not, but the origin should be recorded.

Part 2 ICMS Framework

2.1 Overview

Figure 1 sets out the broader context and scope for the second edition of ICMS, including what is covered beyond the scope of the 1st edition.

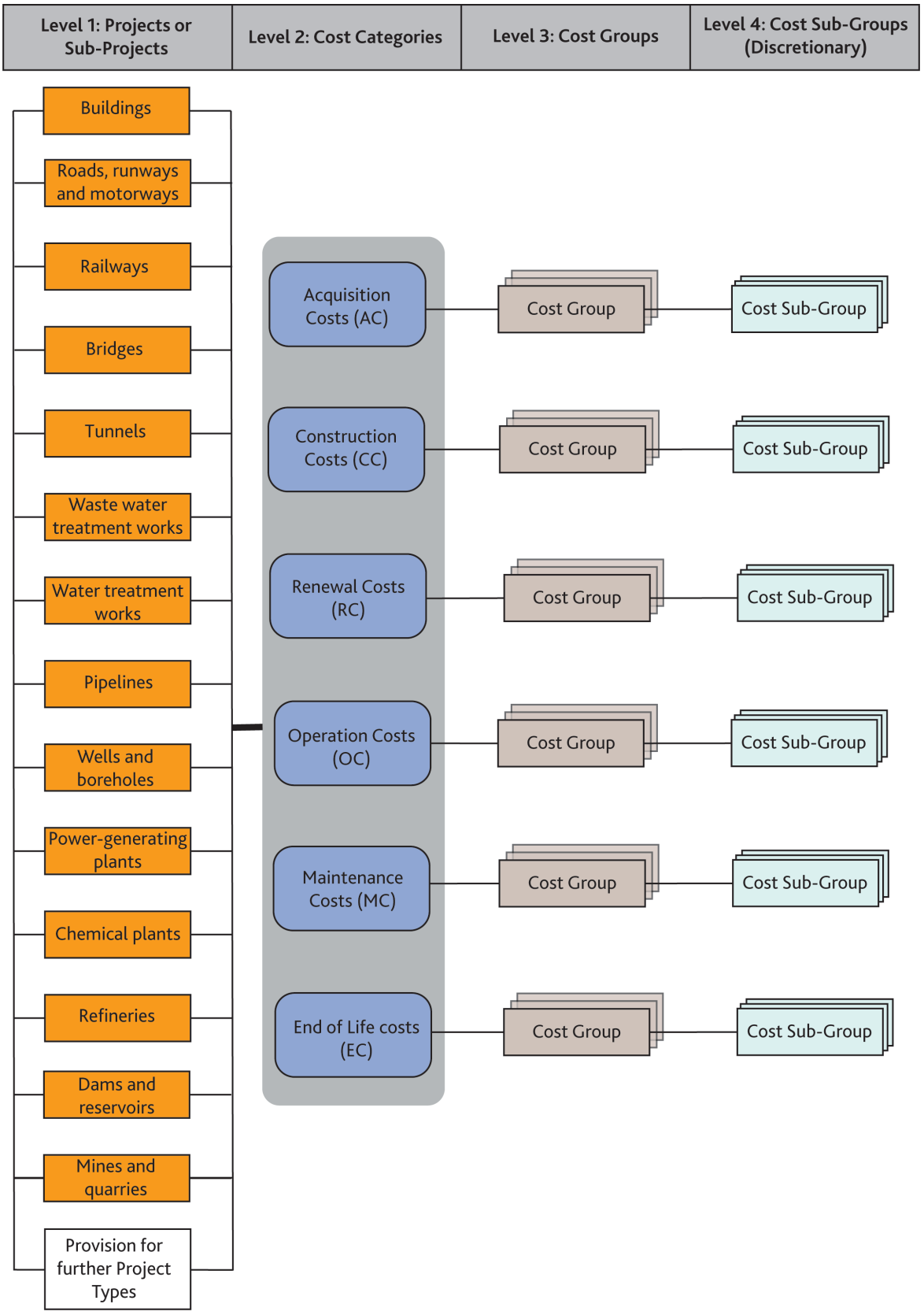
Figure 1: The relationship between ICMS, LCC and WLC



'Occupancy Costs' are considered part of the 'Non-Construction Costs'.

Figure 2 presents the overall taxonomy used in the second edition of ICMS. The taxonomy consists of four levels with Level 1 through Level 3 being mandatory while Level 4 is discretionary.

Figure 2: ICMS Framework including Level 1 Projects and Sub-Projects



2.2 Hierarchical Levels

Figure 3 shows the hierarchical links between the four levels of the ICMS taxonomy, from the highest to the lowest level of detail.

Figure 3: ICMS Hierarchy

The description of each level in Figure 3 is as follows.

Project and Sub-Project (Level 1)

ICMS classify Projects according to their essence and principal purpose. The Projects shown in the framework are not exhaustive and will be further developed in future editions of the Standards. Projects have been assigned the following codes:

Table 1: ICMS Projects with their corresponding codes

01.	Buildings	08.	Pipelines
02.	Roads, runways and motorways	09.	Wells and boreholes
03.	Railways	10.	Power-generating plants
04.	Bridges	11.	Chemical plants
05.	Tunnels	12.	Refineries
06.	Waste water treatment works	13.	Dams and reservoirs
07.	Water treatment works	14.	Mines and quarries

When a Project is too large or complex to be described by a single set of Project Attributes and Values, it is to be subdivided for cost reporting into Sub-Projects, each described by a single set of Project Attributes and Values. A Project can have multiple Sub-Projects. It is also possible to use a combination of Sub-Projects within a Project to report a collection of Projects under the names of 'programme' or 'portfolio'.

Cost Categories and Cost Groups (Levels 2 and 3)

The Cost Categories at Level 2 and Cost Groups at Level 3, as defined in Table 2, are mandatory and standardised for all Projects to enable high-level comparison between different Projects and Sub-Projects.

Table 2: Definitions of Cost Categories (Level 2) and Cost Groups (Level 3)

- Accepted alternative terms are separated with a vertical slash (|).
- All individual costs reported should be those paid or payable by the Client and include the payees' overheads and profits where applicable.
- Different levels of Cost Codes are to be linked together with a '.' in between.
- 'Load bearing work' refers to work bearing the load of the whole building or construction, not just one satisfying its structural integrity. If a piece of work can be removed without the need for temporary structural support or strengthening to the remaining construction, then it should be treated as a piece of 'non-load bearing work'.

Cost Code	Description			
	Cost Categories (Level 2)	AC	CC	RC, OC, MC and EC
	Cost Groups (Level 3)			
	Life Cycle Cost (CC plus NPV of RC, OC, MC, and EC)			
1.	Acquisition Costs (AC) [Part of Non-Construction Costs]			
2.	Construction Costs (CC)			
3.	Renewal Costs (RC)			
4.	Operation Costs (OC)			
5.	Maintenance Costs (MC)			
6.	End of Life Costs (EC)			
1.	**Acquisition Costs (AC)**			
01.	Site acquisition Scope: All payments required to acquire the site, excluding physical construction.			
02.	Administrative, financial, legal and marketing expenses Scope: All other expenses associated with Project realisation, from inception to putting the Project into use, excluding physical construction.			
2.	Construction Costs (CC)		Cost Categories CC, RC and MC use the same Cost Groups	
3.	Renewal Costs (RC)			
5.	Maintenance Costs (MC)			
01.	Demolition, site preparation and formation Scope: All necessary advance or facilitating work to prepare, secure and form the site to enable substructure [construction | renewal | maintenance]			

Cost Code	Description			
	Cost Categories (Level 2)	AC	CC	RC, OC, MC and EC
	Cost Groups (Level 3)			
02.	Substructure Scope: All the load bearing work underground or underwater up to and including the following (including related earthwork, lateral support beyond site formation, and non-load bearing components and services and equipment forming an integral part of composite or prefabricated load bearing work) and as illustrated in Part 4.2: • for buildings: lowest floor slabs, and basement sides and bottom including related waterproofing and insulation • for roads, runways and motorways: sub-base to pavements • for railways: sub-base to rail track structures • for bridges: pile caps, footings, bases nearest ground level or water level if constructed in water • for tunnels: external faces of structural tunnel linings • for tanks and the like underground: external faces of tanks • for tanks and the like above ground: bases supporting tanks • for pipelines underground: beds and surrounds to underground pipes • for pipelines above ground: bases to structures supporting pipes • for wells and boreholes: bases to structures supporting well heads • for dams and reservoirs: seepage ditch, drainage layer/blanket, drain channels, foundation, base, footings, cut-off wall, heel and toe • for mines and quarries: underground mines: bases to structures supporting shaft headgear; open pits: bases to structures; processes: bases to structures, tanks, and bases to major process equipment.			
03.	Structure Scope: All the load bearing work, including non-load bearing components and services and equipment forming an integral part of composite or prefabricated load bearing work, excluding those included in Substructure and Architectural works | Non-structural works.			
04.	Architectural works | Non-structural works Scope: All architectural and non-load bearing work excluding services, equipment, and surface and underground drainage.			

Cost Code	Description			
	Cost Categories (Level 2)	AC	CC	RC, OC, MC and EC
	Cost Groups (Level 3)			
05.	Services and equipment Scope: All fixed services and equipment required [to put the completed project into use for Construction Costs | to sustain the use after completion of construction for Renewal and Maintenance Costs], whether they are mechanical, hydraulic, plumbing, fire-fighting, transport, communication, security, electrical or electronic, excluding external surface and underground drainage.			
06.	Surface and underground drainage Scope: All underground or external surface drainage systems excluding those inside basement or underground construction.			
07.	External and ancillary works Scope: All work outside the external face of buildings or beyond the construction entity required to fulfil the primary function of the Project and not included in other Cost Groups.			
08.	Preliminaries | Constructors' site overheads | general requirements Scope: Constructors' site management, temporary site facilities, site services, and expenses, not directly related to a particular Cost Group, but commonly required to be shared by all Cost Groups.			
09.	Risk Allowances Scope: As defined in section 4.1 but related to [Construction | Renewal | Maintenance] Costs and not included in other Cost Groups.			
10.	Taxes and Levies Scope: As defined in section 4.1 and not included in other Cost Groups.			
11.	Work and utilities off-site Scope: All payments to government authorities or public utility companies to connect | keep connected public work and utilities to the site, or services diversions, to enable the Project, including related risk allowances, taxes and levies.			
12.	Post-completion loose furniture, fittings and equipment Scope: Those provided for the Project to perform its function close to or after completion of construction, including related risk allowances, taxes and levies.			
13.	Construction | Renewal | Maintenance-related consultancies and supervision Scope: Fees and charges payable to Service Providers not engaged by the Constructors, including related risk allowances, taxes and levies.			

Cost Code	Description			
	Cost Categories (Level 2)	AC	CC	RC, OC, MC and EC
	Cost Groups (Level 3)			
4.	Operation Costs (OC)			
01.	Cleaning Scope: Periodic, routine and specialist cleaning of internal and external works.			
02.	Utilities Scope: Fuel, including gas, electricity, fuel oil solid and other fuel; water and drainage including water rates, effluents sewerage drainage and other charges.			
03.	Waste management Scope: Collection, compaction, removal and disposal and/or recycling general and toxic waste from the constructed asset.			
04.	Security Scope: Physical security (such as access control, CCTV camera) including staff or contractors involved in providing security controls via remote support centres, to the constructed asset.			
05.	Information and communications technology Scope: Information communications systems (such as Public address and Communications cabling and IT support services built as a constructed asset, as well as technology used for monitoring assets (i.e. Building Management Systems) and physical sensors.			
06.	Operators' site overheads | general requirements Scope: Operators' site management, temporary site facilities, site services, and expenses, not directly related to a particular Cost Group, but commonly required to be shared by all Cost Groups.			
07.	Risk Allowances Scope: As defined in Part 4.1 but related to Operation Costs and not included in other Cost Groups.			
08.	Taxes and Levies Scope: As defined in Part 4.1 but related to Operation Costs.			
6.	End of Life Costs (EC)			
01.	Disposal inspection Scope: Inspections carried out in connection with demolition, dilapidations or other contractual requirements.			
02.	Decommissioning and decontamination Scope: All post-occupation activities required to render the constructed asset ready for demolition.			

Cost Code	Description			
	Cost Categories (Level 2)	AC	CC	RC, OC, MC and EC
	Cost Groups (Level 3)			
03.	Demolition, reclamation and salvage Scope: Demolition of the constructed asset at end of life or period of interest, and landfill and recycling or disposal.			
04.	Reinstatement Scope: Dealing with dilapidations, measures to comply with other contractual obligations to return the constructed asset to a required standard of repair.			
05.	Constructors' site overheads | general requirements Scope: Constructors' site management, temporary site facilities, site services, and expenses, not directly related to a particular Cost Group, but commonly required to be shared by all Cost Groups.			
06.	Risk Allowances Scope: As defined in Part 4.1 but related to End of Life Costs and not included in other Cost Groups.			
07.	Taxes and Levies Scope: As defined in Part 4.1 but related to End of Life Costs.			

Cost Sub-Groups (Level 4)

The costs of components of a Project or Sub-Project under each Cost Group serving a specific function or common purpose are grouped into one Cost Sub-Group, such that the costs of alternatives serving the same function can be compared, evaluated and selected. Cost Sub-Groups are chosen irrespective of their design, specification, materials or construction.

ICMS do not mandate the classification of the Cost Sub-Groups (Level 4), but the following appendices provide examples of what might be included:

- Appendix A – Acquisition Costs Sub-Groups
- Appendix B – Construction | Renewal | Maintenance Costs Sub-Groups: Buildings
- Appendix C – Construction | Renewal | Maintenance Costs Sub-Groups: Civil Engineering Works
- Appendix D – Operation Costs Sub-Groups
- Appendix E – End of Life Costs Sub-Groups.

Users of ICMS may adopt a Cost Sub-Group classification based on trades, work breakdown structure or work results according to their local practice.

Cost Codes

Cost Codes are a unique identifier for digital purposes. They have been assigned to the ICMS hierarchy down to Level 4. However, since the classification of the Cost Sub-Groups at Level 4 is not mandatory, these Cost Codes may be suitably adjusted.

Note: Costs should, as far as practicable, be stated in their payment currencies. When it is necessary to carry out a currency conversion, the exchange rates or conversion factors used and the applicable dates should be stated.

2.3 Project Attributes and Values

To enable consistent and concise evaluation and comparison between different Projects or different design schemes, ICMS provide a set of Project Attributes and Values in Part 3 describing the principal characteristics of each Project or Sub-Project.

2.4 Life Cycle Cost Considerations

Setting the scope of the Life Cycle Costs

Life Cycle Costing (LCC) is an economic evaluation method that takes account of all relevant costs over a time horizon (Period of Analysis). Presentation of life cycle costs should make clear the scope of those costs included or excluded (as defined in the Cost Categories and Cost Group tables) and the relevant level of costs for the LCC purpose, as well as dealing with the time value of money.

LCC may be reported at a lesser level of detail than the underlying analysis. For example, the detailed cost analysis may be at Level 4 Cost Sub-Groups, whereas reporting may be at Constructed Asset Level 1 Project or Sub-Project Costs or Level 2 Cost Categories or Level 3 Cost Groups.

LCC may be part of a wider economic project evaluation that considers the whole life costs (including non-construction costs such as finance, business income from sales and disposals, occupancy costs and externalities).

Expected asset life

The design life of the Constructed Asset is a key performance requirement and should be defined in the project brief. The estimated expected service life of the Constructed Asset should be at least as long as the design life.

Renewals of Constructed Assets during the expected service life should be included in the life cycle cost's Period of Analysis, as well as any associated end of life or handback obligations.

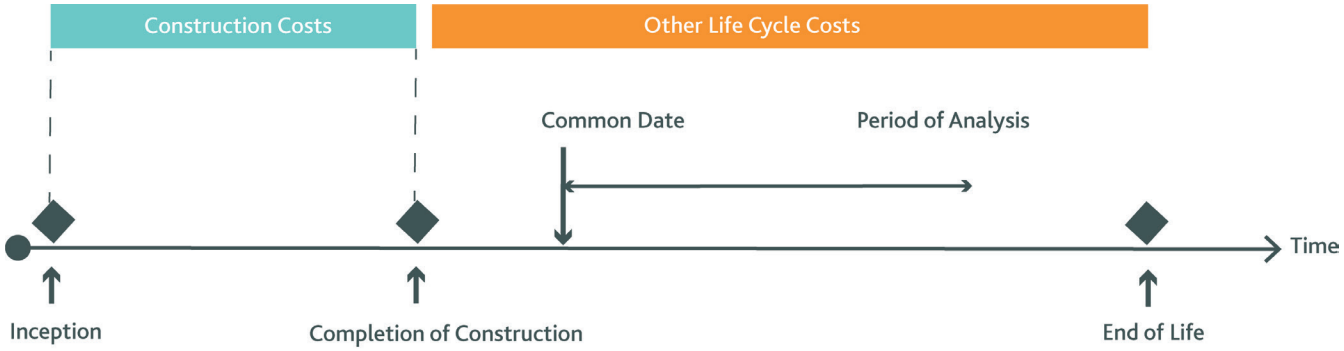
Time value of money

The initial Construction Costs reported should be the forecast or actual final costs to complete the construction of the Project. Forecast costs should include an adjustment for price level fluctuations until the completion of the Project using published market indices and an agreed Base Date.

The rest of the LCC should be the forecast costs after the completion of construction until the end of life or a shorter Period of Analysis (e.g. one to ten years). This should be defined in the project scope, discounted to a Common Date not earlier than the completion of construction and made using Discount

Rates mandated by government authorities for public projects or published Discount Rates for the market where the Project is located for private projects or other rates such as those designated by the Client. These interrelated terms of LCC are illustrated in Figure 4.

Figure 4: LCC Calculations and Period of Analysis



ICMS can be used to report and compare actual costs which have been collected, recorded and analysed. Actual costs should be recorded in the amounts paid. When historic actual costs are used for forecasting future costs, Price Level Adjustments should be made to bring the historic costs to the desired date of payment. LCC has certain cost variables. It is therefore important to record the purpose, scope, form and method of the economic appraisal as well as the Common Date and the underlying assumptions, risks and uncertainty, information and data sources.

Net Present Value Calculations

For option appraisal based on LCC the Net Present Values (NPV) of different options should be compared. The NPV of an option should be a single figure that sums up the present values of all relevant future LCC occurring during the Period of Analysis. NPV is the normal measure for discounted LCC.

To convert a future cost to the present value (cost) at the Common Date, the following formulae, using $ as an example currency, can be used:

Present value = future cost × discounting factor

R% = Discount Rate per annum

Discounting factor for the same cost spent at the end of year N after the Common Date

= PV of $1 after N years

$= 1 / (1 + R\%)^{N}$

Discounting factor for a cost spent annually for N years after the Common Date

= PV of $1 per annum after N years

$= [1 - 1 / (1 + R\%)^{N}] / R\%$

Part 3 Project Attributes and Values

This part of the standard sets out the Project Attributes and Values to be used when presenting costs. These attributes have been carefully selected and are limited to those that have a direct bearing on the costs. Cost comparisons are made possible within project types by these Project Attributes and Values.

Note 1: All Values should be given so long as the attributes are relevant.

Note 2: Alternative Values are separated with a vertical slash (|). More than one alternative Value may be chosen. Some Attributes are multi-valued requiring the entry of sets of sub-attributes and Values, e.g. more than one set of dimensions or quantities are to be stated when more than one size is involved.

Note 3: All quantities should be rounded to the nearest whole number unless considered inappropriate in special circumstances.

Note 4: These Project Attributes and Values capture the minimum principal cost-significant characteristics of a Project or Sub-Project. Users may add more Project Attributes and Values to suit their needs.

Note 5: The values of functional units refer to the designed values.

Table 3: Common Project Attributes and Values

Project Attributes	Values
Common for all Projects and Sub-Project Types (Project level only)	
Report	
Project title	
Status of cost report	pre-construction forecast | at tender | during construction | actual costs of construction post-completion | renewal forecast during use | end of life forecast
Date of cost report	(month and year)
Revision number of cost report	
Brief description of the Project	
• client's name	
• main Project type (principal Sub-Project)	
• brief scope	
Location and country	International Organization for Standardization (ISO) country code (e.g. CN) | address of building site(s) | start and end locations for linear civil engineering works

Project Attributes	Values
Common for all Projects and Sub-Project Types (Project level only)	
Sub-Projects included	buildings | roads, runways and motorways | railways | bridges | tunnels | waste water treatment works | water treatment works | pipelines | wells and boreholes | power-generating plants | chemical plants | refineries | dams and reservoirs | mines and quarries | common | other stated
Construction Cost Price Level	
ISO currency code	(e.g. USD)
Base date of costs (if individual cost is exclusive of Price Level Adjustments after that date)	(month and year)
Price basis	fixed unit rates | unit rates subject to fluctuating adjustment
Construction Cost Currency Conversion	
Conversion date	
Exchange rates or other conversion factors (used to convert a cost report of multi-currencies into a single currency)	(numeric conversion and currency codes)
Construction Programme	
Project status	initiation and concept phase | design phase | construction and commissioning phase | complete
Construction period	
• number of months	
• start date (planned or actual)	(Month and year)
• end date (planned or actual)	(Month and year)
Site	
Existing site status	
• state of use	greenfield | brownfield
• type of use	urban | rural | agricultural
Legal status of site	freehold | leasehold | joint venture | not owned | other stated
Site topography	principally flat | principally hilly | mountainous | offshore | other stated
Ground conditions (predominant)	soft | rocky | reclaimed | submerged | swampy
Seismic zones (state more than one if applicable based on location)	
Site conditions and constraints	
• access problems	difficult | average | easy
• extreme climatic conditions	difficult | average | easy

Project Attributes	Values
Common for all Projects and Sub-Project Types (Project level only)	
• environmental constraints	difficult | average | easy
• statutory planning constraints	difficult | average | easy
Construction Procurement	
Funding	private | public | public and private in partnership
Project delivery	
• pricing method	lump sum | stipulated price | re-measurement | cost reimbursement | other stated
• mode of procurement	design bid build | design and build (turnkey) | build operate and transfer | public private partnership | management contracting | construction management | engineer procure construct | target | other stated
• joint venture foreign Constructor	yes | no
• predominant source of Constructors	local | foreign
Life Cycle Cost Related	
Life cycle costing	
• purpose	for a business case | for option appraisals | for producing a sinking fund | for cost analysis | other stated
• method of presentation of costs	net present value
• common date (to which all costs are discounted or compounded)	(month and year)
• project status at common date	initiation and concept phase | design phase | construction and commissioning phase | in use | close to end of life
• discount rate	real discount rate | nominal discount rate (% per annum)
Expected constructed asset life span after completion of construction	design life | alternative life span (years)
Period of analysis for life cycle costing	
• until	end of life | end of interest
• from	(month and year)
• to	(month and year)
• number of months l years	(months l years)
Primary usage type constraints affecting expected life and life cycle costs (if applicable)	

Project Attributes	Values
Common for all Projects and Sub-Project Types **(Project level only)**	
• hours of operation (e.g. office hours 9 to 5.30 Monday to Friday)	
• access restrictions	
• environmental	
• statutory	
• contractual	
• others	
Renewals planned (during period of analysis)	
• scope of renewal (stating key Cost Groups/Sub-Groups included)	• (a) = • (b) = • (c) = • etc
• respective cycle (e.g. every 5 years)	• (a) = • (b) = • (c) = • etc. (years)
• number of renewal cycles included (during the period of analysis)	• (a) = • (b) = • (c) = • etc.
End of Life Costs	
• handback obligations at end of life/ period of analysis (if applicable)	

Project Attributes	Values
Table 4: Buildings **(A construction with a cover and enclosure to house people, equipment or goods)**	
Code	
Local functional classification standard	
• name of standard	
• code number of construction	
Works	
Functional type	residential | office | commercial | shopping centre | industrial | hotel | car park | warehouse | educational | hospital | airport terminal | railway station | ferry terminal | plant facility | other stated
Nature	new build | major adaptation | temporary
Grade (qualitative description to be read in conjunction with the location)	ordinary quality | medium quality | high quality
Hotel grade	international below 4-star | international 4-star | international 5-star | international over 5-star | local below 4-star | local 4-star | local 5-star | local over 5-star
Environmental grade	
• grade and name of environmental certification	
• status	targeted | achieved | none
Principal design features	
• structural (predominant)	timber | concrete | steel | load bearing masonry | other stated
• external walls (predominant)	stone | brick/block | render/block | curtain walling | other stated
• environmental control	non-air conditioned | air conditioning
• degree of prefabrication	less than 25% | up to 50% | up to 75% | up to 100%, of Construction Costs
• major prefabricated work	suites (inclusive of toilets, kitchens and the like) | standalone toilets, bathrooms, shower rooms and the like | standalone kitchens | classrooms | heathcare rooms | operating theatres | plant rooms, pipe ducts and the like | soundproof rooms | computer rooms | cold rooms | kiosks | balconies | corridors | staircases | other stated
Project Complexity	
• shape (on plan)	circular, elliptical or similar | square, rectangular, or similar | complex
• shape (vertical section)	circular, elliptical or similar | square, rectangular, or similar | complex

Project Attributes	Values
Table 4: Buildings **(A construction with a cover and enclosure to house people, equipment or goods)**	
• design	simple | bespoke | complex
• method of working	sectional completion | out-of-hours working | confined working | other stated
Design life	(years)
Average height of site above or below sea level	(m | ft)
Dimensions (overall length × width × height of each building to highest point of the building)	(m | ft)
Typical storey height (floor level to floor level)	(m | ft)
Other storey heights and applicable floors	(m | ft)
Number of storeys above ground (qualitative description to be read in conjunction with the location)	house | low rise | medium rise | high rise
Number of storeys above ground (quantitative)	specific number 0–3 | 4–7 | 8–20 | 21–30 | 31–50 | over 50
Number of storeys below ground	specific number
Project Quantities	
Site area (within legal boundary of building site, excluding temporary working areas outside the site)	(m^2 | ft^2)
Covered area on plan	(m^2 | ft^2)
Gross external floor area as IPMS 1 (EXTERNAL)	(m^2 | ft^2)
Gross internal floor area as IPMS 2 (INTERNAL)	(m^2 | ft^2)
Functional units	number of occupants | number of bedrooms | number of hospital beds | number of hotel rooms | number of car parking spaces | number of classrooms | number of students | number of passengers | number of boarding gates | other stated

Project Attributes	Values
Table 5: Roads, Runways and Motorways **(A pavement providing a thoroughfare, route, or way for vehicular traffic on land between two or more places including but not limited to alley, street, collector and rural roads, motorways, county and interstate highways, hardstandings. Elevated roads and motorways that are an integral part of bridges shall be included in bridges). Roads in tunnels shall be included in tunnels**	
Code	
Local functional classification standard	
• name of standard	
• code number of construction	
Works	
Functional type	motorway | highway | freeway | expressway | road | lane | runway | hardstanding
Nature	new build | major adaptation | temporary
Environmental grade	
• grade and name of environmental certification	
• status	targeted | achieved | none
Principal design features	
• position	at grade | in cutting | on embankment | elevated
• design speed	(km | miles per hour)
• number of carriageways	
• number of lanes per carriageway	
• lane width	(m | ft)
• hard shoulders	yes | no
• footways	yes | no
• footway width	(m | ft)
• surfacing	flexible construction | concrete pavement
• vertical profile	switchbacks | undulating | flat
• plan profile	straight | winding
Project Complexity	
• number of grade-separated intersections	
• number of at-grade intersections	
• number of crossings over other roads, railways, waterways, valleys and the like	
• number of access ramps	
Design life	(years)
Altitude	
• minimum height of passageway above or below sea level	(m | ft)

Project Attributes	Values
Table 5: Roads, Runways and Motorways **(A pavement providing a thoroughfare, route, or way for vehicular traffic on land between two or more places including but not limited to alley, street, collector and rural roads, motorways, county and interstate highways, hardstandings. Elevated roads and motorways that are an integral part of bridges shall be included in bridges). Roads in tunnels shall be included in tunnels**	
• maximum height of passageway above or below sea level	(m | ft)
Dimensions	
Total width of metalled surface of each road, runway or motorway (including hard shoulders but excluding footways)	(m | ft)
Project Quantities	
Total length (between two places, irrespective of number of lanes)	(km | miles)
Equated lane length (being the length of all lanes along the route, including those in passing loops, sidings and depots reduced to a single length)	(km | miles)
Total paved area	(m^2 | ft^2)
Functional units	
• capacity	(vehicles per hour)

Project Attributes	Values
Table 6: Railways **(A permanent way comprising a rail track composed of two parallel rails fixed to sleepers, or single monorail that includes spurs, sidings and turnouts for train traffic or the like, including tramways, metro rails, light rails and other rapid mass transit systems)**	
Code	
Local functional classification standard	
• name of standard	
• code number of construction	
Works	
Functional type	high speed | express | light rail | tram | freight | mixed traffic | other stated
Nature	new build | major adaptation | capacity enhancement
Environmental grade	
• grade and name of environmental certification	
• status	targeted | achieved | none
Principal design features	
• position	at grade | in cutting | on embankment | in tunnel | elevated | other stated
• design speed	(km | miles per hour)
• maximum axle loading of traffic	(tonnes | ton)
• train power systems	overhead AC | overhead DC | third or contact rail(s) DC | diesel electric | bi-mode | other stated
• number of tracks	
• track gauge	(m | ft)
• track rigidity	flexible | rigid | other stated | not applicable
• rail joints	fish-plated | welded
• control system	European Train Control System | in cab | block signalling | centralised traffic control | other stated
• signalling system	European Railway Traffic Management System | semaphore | coloured light | inductive loop
Project Complexity	
• number of point ends	
• number of intersections with roads and other railways	
• number of crossings over roads, other railways, waterways, valleys and the like	
Design life	(years)
Altitude	
• minimum height of track bed above or below sea level	(m | ft)

Project Attributes	Values
Table 6: Railways **(A permanent way comprising a rail track composed of two parallel rails fixed to sleepers, or single monorail that includes spurs, sidings and turnouts for train traffic or the like, including tramways, metro rails, light rails and other rapid mass transit systems)**	
• maximum height of track bed above or below sea level	(m | ft)
Dimensions	
• average width of rail corridor between legal boundaries	(m | ft)
Project Quantities	
Route length (between start and finish points of longest route plus start and finish points of ancillary routes irrespective of number of tracks)	(km | miles)
Equated track length (being the length of all tracks along the route, including those in passing loops, sidings and depots reduced to a single length)	(km | miles)
Functional units	
• weight of traffic expressed as estimated gross million tonnes or tons per annum	(M tonnes | M tons/year)
• passenger journeys	(million journeys per year)

Project Attributes	Values
Table 7: Bridges **(A structure designed to span across a physical obstacle)**	
Code	
Local functional classification standard	
• name of standard	
• code number of construction	
Works	
Functional type (serving)	roads | rail | conveyors | pipeline | canal | pedestrians | other stated
Nature	new build | major adaptation | temporary
Environmental grade	
• grade and name of environmental certification	
• status	targeted | achieved | none
Principal design features	
• support	arch | post and beam | cantilever | suspension | cable-stayed | other stated
• mobility	fixed | movable | temporary
• materials	natural materials | wood | concrete | steel | advanced materials | other stated
Types of obstacles crossed	river and canal | roads and motorways | railways | other stated
Project Complexity	
• curvature (predominant)	straight | curved
• number of access ramps	
• number each of abutments/piers/towers with foundations in water	
• number each of abutments/piers/towers with foundations not in water	
Design life	(years)
Altitude	
• average height of deck above or below sea level	above | below (m | ft)
Dimensions	
• width (including walkways, hard shoulders and the like)	(m | ft)
• maximum height above the lowest point land/water	(m | ft)
• minimum clearance height	(m | ft)

Project Attributes	Values
Table 7: Bridges **(A structure designed to span across a physical obstacle)**	
Project Quantities	
Deck length measured from face to face of abutments	(km | miles)
Surface area of deck	(m^2 | ft^2)
Functional units	
• capacity	(vehicles | litres | gallons | tonnes | tons per hour)

Project Attributes	Values
Table 8: Tunnels **(An artificial underground or underwater passageway, completely enclosed except for openings for entrance and exit, commonly at each end, and for ventilation)**	
Code	
Local functional classification standard	
• name of standard	
• code number of construction	
Works	
Functional type	road | railway | pipeline | conveyor | other stated
Nature	new build | major adaptation | temporary
Environmental grade	
• grade and name of environmental certification	
• status	targeted | achieved | none
Principal design features	
• tunnelling method	cut and fill | tunnel-boring machine | drill and blast | immersed | other stated
• in compressed air	yes | no
• lining	iron | steel | concrete | not lined
• curvature (predominant)	straight | curved | other stated
• underwater	yes | no
• ventilated	yes | no
• number and size of portal structures	
• number of cross passages separated by a dividing wall	
• number of shafts	
• average depth below water or ground level	(m | ft)
Project Complexity	
• number of intersections	
• horizontal profile (predominant)	flat | undulating
• cross sectional shape	circular | oval | rectangular | other stated
Design life	(years)
Altitude	
• minimum height of passageway above or below sea level	(m | ft)
• maximum height of passageway above or below sea level	(m | ft)
Dimensions	
• overall cross section area of the tunnel (range stated in case of varying cross sections)	(m^2 | ft^2)

Project Attributes	Values
Table 8: Tunnels **(An artificial underground or underwater passageway, completely enclosed except for openings for entrance and exit, commonly at each end, and for ventilation)**	
• overall dimensions (width x height | diameter) (range stated in case of varying cross sections)	(m | ft)
Project Quantities	
End to end length	(km | miles)
Equated track length (being the length of all tracks inside the tunnel)	(km | miles)
Equated lane length (being the length of all tracks inside the tunnel)	(km | miles)
Volume of excavation	(m^3 | yd^3)
Functional units	
• capacity	(vehicles | litres | gallons | tonnes | tons per hour)

Project Attributes	Values
Table 9: Waste Water Treatment Works **(A facility for the cleaning and improvement of water that contains waste products, contaminants or pollutants to make it safe for discharge to land or water)**	
Code	
Local functional classification standard	
• name of standard	
• code number of construction	
Works	
Functional type (descriptions of primary, secondary and tertiary treatment processes)	
Nature	new build | major adaptation
Environmental grade	
• grade and name of environmental certification	
• status	targeted | achieved | none
Principal design features	
• plant technology	
• number of processes	
• tank materials for each process	steel | concrete | other stated
• term of use	fixed | temporary
Project Complexity	
• standard of cleanliness of treated water (expressed in terms of significant parameters, e.g. Biological Oxygen Demand, Suspended Solids, etc.)	
Design life	(years)
Altitude	
• average height of site above or below sea level	(m | ft)
Dimensions	
• overall external diameter or length × width × height of each major structure	(m | ft)
Project Quantities	
Site area (area of land covered by permanent work, excluding temporary working areas outside the site)	(hectares | acres)
Functional units	
• capacity	(litres | gallons per day)

Project Attributes	Values
Table 10: Water Treatment Works **(A facility for the cleaning and improvement of water to make it potable)**	
Code	
Local functional classification standard	
• name of standard	
• code number of construction	
Works	
Functional type (descriptions of processes involved)	screening | pre-ozonation | coagulation | flocculation | clarification | filtration | pH correction | chemical dosing | chlorination | other stated
Nature	new build | major adaptation
Environmental grade	
• grade and name of environmental certification	
• status	targeted | achieved | none
Principal design features	
• plant technology	
• number of processes	
• tank materials for each process	steel | concrete | other stated
• term of use	fixed | temporary
Project Complexity	
• standard of cleanliness of treated water (expressed in terms of significant parameters e.g. microbial, chemical, radiological, appearance, etc.)	
Design life	(years)
Altitude	
• average height of site above or below sea level	(m | ft)
Dimensions	
• overall external diameter or length × width × height of each major structure	(m | ft)
Project Quantities	
Site area (area of land covered by permanent work, excluding temporary working areas outside the site)	(hectares | acres)
Functional units	
• capacity	(litres | gallons per day)

Project Attributes	Values
Table 11: Pipelines **(A series of pipes and tubing for the transfer of liquid, gas or powder)**	
Code	
Local functional classification standard	
• name of standard	
• code number of construction	
Works	
Functional type (for transporting)	liquid | gas | powder
Nature	new build | major adaptation | temporary
Environmental grade	
• grade and name of environmental certification	
• status	targeted | achieved | none
Principal design features	
• principal materials	steel | cast iron | precast concrete | uPVC | other stated
• minimum and maximum depths below ground	(m | ft)
• minimum and maximum heights above ground	(m | ft)
• drilling/boring method	cut and cover | directional drilling/boring | none
• insulation type, if insulated	
• corrosion protection measures	
Project Complexity	
• position	on land | underwater
• number of intersections	
• number of piping specials (e.g. tie-ins, hot tap and other interface requirements before commissioning)	
• number of crossings over roads, railways, waterways, valleys and the like	
• number of pumping stations, inspection points, pressure relief points	
Design life	(years)
Altitude	
• minimum height above or below sea level	(m | ft)
• maximum height above or below sea level	(m | ft)
Dimensions	
• length of each diameter of pipes	(m diameter x km long | ft diameter x miles long)
Project Quantities	
Total length of pipes	(km | miles)
Length from servicing inlets to outlets	(km | miles)
Functional units	
• capacity	(litres | gallons | m^3 | ft^3 per hour)

Project Attributes	Values
Table 12: Wells and Boreholes **(Process of drilling or boring in the ground for extraction of a natural resource or the injection of a fluid, or for the evaluation/monitoring of subsurface formations)**	
Code	
Local functional classification standard	
• name of standard	
• code number of construction	
Works	
Functional type (for extracting)	water | gas | oil | other stated
Nature	new build | major adaptation
Environmental grade	
• grade and name of environmental certification	
• status	targeted | achieved | none
Principal design features	
• lining material	steel | concrete | other stated
Project Complexity	
• position	onshore | offshore
• direction	vertical | directional
Design life	(years)
Altitude	
• commencing height above sea level	(m | ft)
• commencing height below sea level	(m | ft)
Dimensions	
• number of wells/boreholes	
• length of each diameter of vertical drilled/ bored wells/boreholes	(m diameter x m long | ft diameter x ft long)
• length of each diameter of inclined or horizontal drilled/bored wells/boreholes	(m diameter x m long | ft diameter x ft long)
Project Quantities	
Total length drilled/bored	(m | ft)
Functional units	
• capacity	(m^3 | ft^3 | litres | gallons per hour)

Project Attributes	Values
Table 13: Power-Generating Plants **(A facility for the generation of electrical power. Major buildings and civil engineering works shall be reported under separate Sub-Projects under a power-generating plant Project)**	
Code	
Local functional classification standard	
• name of standard	
• code number of construction	
Works	
Functional type	nuclear | wind | solar | hydroelectric | geothermal | biomass | gas | coal | oil | other stated
Nature	new build | major adaptation
Environmental grade	
• grade and name of environmental certification	
• status	targeted | achieved | none
Principal design features	
• generator containment material	concrete | steel | other stated
• coolant	water | gas | other stated
• cycle	open | closed
• number and size of turbines	(MW)
Project Complexity	
• cooling system	wind | water | other stated
Design life	(years)
Altitude	
• average height of site above or below sea level	above | below (m | ft)
Dimensions	
• overall external diameter or length × width × height of each major structure	(m | ft)
Project Quantities	
Site area (area of land covered by permanent work, excluding temporary working areas outside the site)	(hectares | acres)
Functional units	
• capacity	(MW)

Project Attributes	Values
Table 14: Chemical Plants **(A facility for the creation of chemical products excluding petro-chemicals. Major buildings and civil engineering works shall be reported under separate Sub-Projects under a chemical plant Project)**	
Code	
Local functional classification standard	
• name of standard	
• code number of construction	
Works	
Functional type (product description: specify the products produced and the principal source of energy (oil, gas, electricity etc.) and number of types or varieties of products)	
Nature	new build | major adaptation
Environmental grade	
• grade and name of environmental certification	
• status	targeted | achieved | none
Principal design features	
• principal processes (more than one if applicable)	oxidation | reduction | hydrogenation | dehydrogenation | hydrolysis | hydration | dehydration | halogenation | nitrification | sulphonation | ammoniation | alkaline fusion | alkylation | dealkylation | esterification | polymerisation | polycondensation | catalysis | waste treatment | storage facility | other stated
• principal reactor materials	mild steel | stainless steel | concrete | other stated
Project Complexity	
• number of processes	
Design life	(years)
Altitude	
• average height of site above or below sea level	(m | ft)
Dimensions	
• overall external diameter or length × width × height of each major structure	(m | ft)
Project Quantities	
Site area (area of land covered by permanent work, excluding temporary working areas outside the site)	(hectares | acres)
Functional units	
• output of products	(m^3 | ft^3 | tonnes | tons | litres | gallons per day)

Project Attributes	Values
Table 15: Refineries **(A downstream facility for the creation of petro-chemical products. Major buildings and civil engineering works shall be reported under separate Sub-Projects under a refinery Project. Wells and boreholes are upstream and Pipelines are midstream)**	
Code	
Local functional classification standard	
• name of standard	
• code number of construction	
Works	
Functional type	oil | petrol | other stated
Nature	new build | major adaptation
Environmental grade	
• grade and name of environmental certification	
• status	targeted | achieved | none
Principal design features	
• principal processes	upstream | downstream
• principal reactor materials	mild steel | stainless steel | concrete | other stated
Project Complexity	
• number of processes	
• number of products	
Design life	(years)
Altitude	
• average height of site above or below sea level	above | below (m | ft)
Dimensions	
• overall external diameter or width x height of each major structure	(m | ft)
Project Quantities	
Site area (area of land covered by permanent work, excluding temporary working areas outside the site)	(hectares | acres)
Functional units	
• input of crude oil	(tonnes | tons | litres | gallons | barrels per day)
• output of products	(tonnes | tons | litres | gallons | barrels per day)

Project Attributes	Values
Table 16: Dams and Reservoirs **(A barrier that stops or restricts the flow of water (i.e. fresh water, sea water, coral reef water) or underground streams. A reservoir created by dams may provide water for irrigation, human consumption, industrial use, recreation, aquaculture and navigation. Dams generally serve the primary purpose of retaining water.)**	
Code	
Local functional classification standard	
• name of standard	
• code number of construction	
Works	
Functional type	fresh water | waste water | sea water
Functional purpose	power generation | water supply | stabilisation of water flow | flood prevention | land reclamation | irrigation | water diversion | navigation | other stated
Nature	new build | expansion of existing
Environmental grade	
• grade and name of environmental certification	
• status	targeted | achieved | none
Principal design features	
• structure	arch | gravity | embankment | barrage | other stated
• core	compaction | earth fill | clay | asphaltic | other stated (m^3 | cubic yard)
• facing	concrete | clay | other stated (m^2 | square feet)
• location	above ground | underground | other stated
• infrastructure	access roads | hydro-electric plant | site works | power supply | water supply | pipelines
• principal materials	rock fill | earth fill | concrete | timber | steel | clay | rock | other stated
Project Complexity	
• water balance	positive | negative | clean water | dirty water | spillway
Number of layers	
• geotechnical	natural depression | flat ground | slope design | thickness of dam wall | saddle dam (fill void between peaks)
• flow rate	(m^3 per second | cubic feet per second)

Project Attributes	Values
Table 16: Dams and Reservoirs **(A barrier that stops or restricts the flow of water (i.e. fresh water, sea water, coral reef water) or underground streams. A reservoir created by dams may provide water for irrigation, human consumption, industrial use, recreation, aquaculture and navigation. Dams generally serve the primary purpose of retaining water.)**	
Design life	(years)
Altitude	
• average height of site	above or below sea level (m | ft)
Dimensions	
• number of dam structures	main wall | saddle dam walls Each
• principal dam wall height	(m | ft)
• principal dam crest length	(m | ft)
• principal dam min thickness	(m | ft)
• principal dam max thickness	(m | ft)
Project Quantities	
Site area (surface area of stored liquid at maximum capacity)	(square km | square miles)
Functional units	
• reservoir capacity	(million m^3 | million cubic yards)
• power generation capacity	(MW)

Project Attributes	Values
Table 17: Mines and Quarries **(The identification of potential sites, the extraction by mining, quarrying or pumping of minerals and/or other geological materials from the earth, usually from an orebody, lode, vein, seam, reef or placer deposit, and the processing operation that uses heat and/or chemicals to separate the metal or other substance of interest. A quarry is similar to an open-pit mine from which minerals are extracted.)**	
Code	
Local functional classification standard	
• name of standard	
• code number of construction	
Works	
Functional type	diamonds | precious metals | base metals | natural solid inorganic material (i.e. alumina, bauxite, rock etc.) | organic material (coal etc.) | hydrocarbons (solid and liquid)
Nature	new build (greenfield) | major adaptation (brownfield)
Terrain	forest | desert | urban | rural
Region	
Depth to ore body	(m | ft)
Environmental grade	
• grade and name of environmental certification	
• status	targeted | achieved | none
Principal design features	
• excavation type	surface | underground (hard rock) | underground (coal and soft rock) | mineral sands | underwater
• metallurgical processes	beneficiation (comminution, concentration, material handling) | leaching and calcining | solvent extraction (ion exchange, carbon-in-pulp, carbon-in-leach, electrolytic) | smelter | waste handling and storage | other stated
• infrastructure	access roads | airstrips | port facilities | site works | power station | power line | water supply | desalination plant | fuel storage | solid waste disposal | communications | railroad | slurry pipeline | river | camp facilities | workshop facilities | administration | township
• waste handling and storage	waste handling | waste storage | tailings | management facility
• reclamation and closure	salvage | rehabilitation of land | pollution monitoring | other stated

Project Attributes	Values
Table 17: Mines and Quarries **(The identification of potential sites, the extraction by mining, quarrying or pumping of minerals and/or other geological materials from the earth, usually from an orebody, lode, vein, seam, reef or placer deposit, and the processing operation that uses heat and/or chemicals to separate the metal or other substance of interest. A quarry is similar to an open-pit mine from which minerals are extracted.)**	
Project Complexity	
• number of processes	
• number of products	
Design life	(years)
Altitude	
• average height of site above or below sea level	above | below (m | ft)
Dimensions	
• number of shafts	
• average shaft diameter	(m | ft)
• average shaft depth	(m | ft)
• average drift and adit cross-section area	(m2 | ft^2)
• total drift and adit length	(m | ft)
Project Quantities	
Site area (area of land covered by permanent work, excluding temporary working areas outside the site)	(hectares | acres)
Functional units	
• ore extraction	(tonnes | tons per annum)
• throughput of product	(tonnes | tons per day)

Part 4 Definitions

4.1 Defined Terms

Acquisition Costs: All payments or considerations required to acquire/lease/purchase the land, property or existing Constructed Asset, and all other expenses associated with the acquisition, excluding physical construction.

Base Date: The date at which the individual Construction Costs in ICMS cost reports apply exclusive of Price Level Adjustments after that date. However, there can be a separate allowance for Price Level Adjustments under the Risk Allowances Cost Group. A different date (the Common Date) may apply to Life Cycle Costs.

Client: The person(s) or entity that pays for the works and services provided. This may include external clients as well as internal.

Coalition: The International Construction Measurement Standards Coalition, comprising not-for-profit organisations, each with a public interest mandate.

Common Date: The date to be used in conjunction with Life Cycle Costing, being a date not earlier than the completion of construction. All future cash flows occurring at different times are discounted or compounded as if the costs are incurred at that date.

Constructed Asset (or Asset): The output from any building or civil engineering project.

Construction Costs: Expenditures incurred as a direct result of construction including labour, materials, plant, equipment, site and head office overheads and profits as well as taxes and levies. They are the total price payable for all permanent and temporary works normally included in construction contracts, including goods or materials supplied by the Client for the Constructor to install.

Constructor: The organisation (or the Contractor) paid by a Client to implement the construction of a Project or part thereof, in some cases including providing funding, design, management, maintenance and operation services as applicable. In the context of other Life Cycle Costs after construction, it means the organisation undertaking the renewal or maintenance works.

Conversion Date: The date or dates at which any currency conversion was made.

Cost Category: A division of Project or Sub-Project costs into Acquisition Costs, Construction Costs, Renewal Costs, Maintenance Costs, Operation Costs, and End of Life Costs.

Cost Code: The recommended numeric coding structure that may be used to uniquely identify Projects, Sub-Projects, Cost Categories, Cost Groups, and Cost Sub-Groups within a submitted ICMS report.

Cost Group: A division of costs under a Cost Category into broad groups to enable easy estimation or extraction of cost data for quick, high-level comparison by design discipline or common purpose.

Cost Management Professional: A Service Provider competent to calculate, interpret, analyse, apportion and report using ICMS.

Cost Sub-Group: A division of costs under a Cost Group solely according to their functions, services, or common purposes to enable the costs of alternatives serving the same function to be compared, evaluated and selected.

Discount Rate: Factor or rate reflecting the time value of money that is used to convert cash flows occurring at different times (ISO 15686-5).

Discounted Cost: The resulting cost when the real cost is discounted by the real discount rate or when the nominal cost is discounted by the nominal discount rate (ISO 15686-5).

End of Life Costs: The net costs or fees for disposing of an asset at the end of its service life after deducting the salvage value and other income due to disposal, including costs resulting from disposal inspection, decommissioning and decontamination, demolition and reclamation, reinstatement, asset transfer obligations, recycling, recovery, disposal of components and materials, and transport and regulatory costs.

External Costs: Costs associated with an asset that are not reflected in the transaction costs between provider and consumer, collectively referred to as Externalities. These costs may include business staffing, productivity, social impact costs and user costs and can be considered in a Life Cycle Cost analysis when explicitly identified (ISO 15686-5).

Externalities: Quantifiable cost or benefit that occurs when the actions of organisations and individuals have an effect on people other than themselves, e.g. non-construction costs, income and wider social and business costs (ISO 15686-5).

GEFA: Gross External Floor Area measured according to IPMS 1 (EXTERNAL) as set out in IPMS and provided in Appendix I.

GIFA: Gross Internal Floor Area measured according to IPMS 2 (INTERNAL) as set out in IPMS and provided in Appendix I.

ICMS: International Construction Measurement Standards.

Income: Money received from sales and other activities during the life of an Asset.

Inflation/Deflation: Sustained increase/decrease in the general price level of resources (ISO 15686-5).

IPMS (International Property Measurement Standards): The global standards that aim to enhance the transparency and consistency in the way property is measured across markets. It was developed by the IPMS Coalition, an independent group of professional bodies from around the world.

IPMS 1 (EXTERNAL): The total of the areas of each floor level of a Building measured to the outer perimeter of External Walls or other external construction features, Sheltered Areas and External Floor Areas, as further defined and detailed in Appendix I.

IPMS 2 (INTERNAL): The total of the areas of each floor level of a Building measured to the Internal Dominant Face of all External Walls and External Floor Areas on each level, as further defined in Appendix I.

Life Cycle Cost (LCC): Cost of a Constructed Asset or its parts throughout its life cycle from construction through use, operation, maintenance and renewal till the end of life or a shorter Period of Analysis, while fulfilling the performance requirements (see Figure 1).

Maintenance Cost: The total cost of labour, material and other related costs to retain a Constructed Asset or its parts so that it can perform its required functions (ISO 15686-5). Maintenance includes conducting corrective, responsive and preventative maintenance on a Constructed Asset or its parts and all associated management, cleaning, services, repainting, repairing or replacing of parts as needed for the Constructed Asset to be used for its intended purpose. It does not include Renewal Costs.

Major Adaptation: A one-off substantial modification/adaptation/extension of, or improvement to, the main parts of an existing Constructed Asset that is not classified as a Renewal.

Net Present Value or Cost: The sum of the discounted future cash flows (SO 15686-5).

Nominal Cost: The expected price that will be paid when a cost is due to be paid, including estimated changes in price due to, for example, forecast change in efficiency, inflation or deflation and technology (ISO 15686-5).

Nominal Discount Rate: The factor or rate used to relate present and future money values in comparable terms, taking into account the general inflation/deflation rate.

Non-Construction Costs: Includes finance costs, service charges, parking charges and charges for associated facilities.

Occupancy Costs: Costs that arise exclusively as a result of the occupation of a Constructed Asset, including reception, library services and porterage. Occupany Costs are part of the Non-Construction Costs.

Operation Costs: Costs incurred in running and managing a Constructed Asset, including administrative support services, rent, insurances, energy and other environmental/regulatory inspection costs, taxes and charges.

Operator: The entity responsible for the running and operation of a Constructed Asset, whose costs should be included under the Operation Costs.

Period of Analysis: Period of time over which Life Cycle Costs are analysed as determined by the Client. It may cover the entire life (physical, technical, economic, functional, social, or legal life) or a selected stage or stages or periods of interest as required by the Client.

Present Day Value: Monies accruing in the future which have been discounted to account for the fact that they are worth less at the time of calculation (ISO 15686-5).

Price Level Adjustment: An allowance for the increases or decreases in the price levels, due to inflation or deflation, over a defined period.

Project Attributes and Values: Attributes being the principal characteristics of a Project or Sub-Project relating to time, cost, the scope of works, design, quality, quantity, procurement, location and other contextual features that might impact its life cycle cost. Values being standard set of descriptions and/or measurements for each of the Project Attributes.

Project Complexity: The relative intricacy of a Project or Sub-Project by reference to its form, design, site constraints, method or timing of construction, renewal, operation, maintenance or end of life activities.

Project Quantities: The physical quantities (numbers, lengths, areas, volumes and weights), functional quantities (capacities, inputs, outputs) and degree of repetition required to be captured in the Project Attributes and Values so the costs of different projects or design schemes can be converted to a unit cost per the desired Project Quantity for evaluation and comparison. Both physical and functional quantities are required for each Project or Sub-Project.

Project: A single or series of construction intervention(s) with a single purpose or common purposes to create a series of or single Constructed Asset commissioned by a Client, or group of Clients, with a defined start and end date. A Project may comprise a number of Sub-Projects.

Real Cost: The cost expressed as a value at the Common Date, including estimated changes in price due to forecast changes in efficiency and technology, but excluding general price inflation or deflation (ISO 15686-5).

Real Discount Rate: The factor or rate used to relate present and future money values in comparable terms, not taking account of general or specific inflation in the cost of a particular asset (ISO 15686-5).

Renewal Costs: The costs of replacing a Constructed Asset and/or major components once they reach the end of their life, and which the Client decides are to be included in the capital rather than the revenue budget.

Reporting Date: The date at which the report describing construction or Life Cycle Costs is compiled.

Risk Allowance: A quantitative allowance set aside as a precaution against risks and future needs to allow for the uncertainty of outcome.

Risk: Probability of an event occurring multiplied by its consequences. Risks may have a positive or negative influence on a Project's outcome (ISO 15686-5).

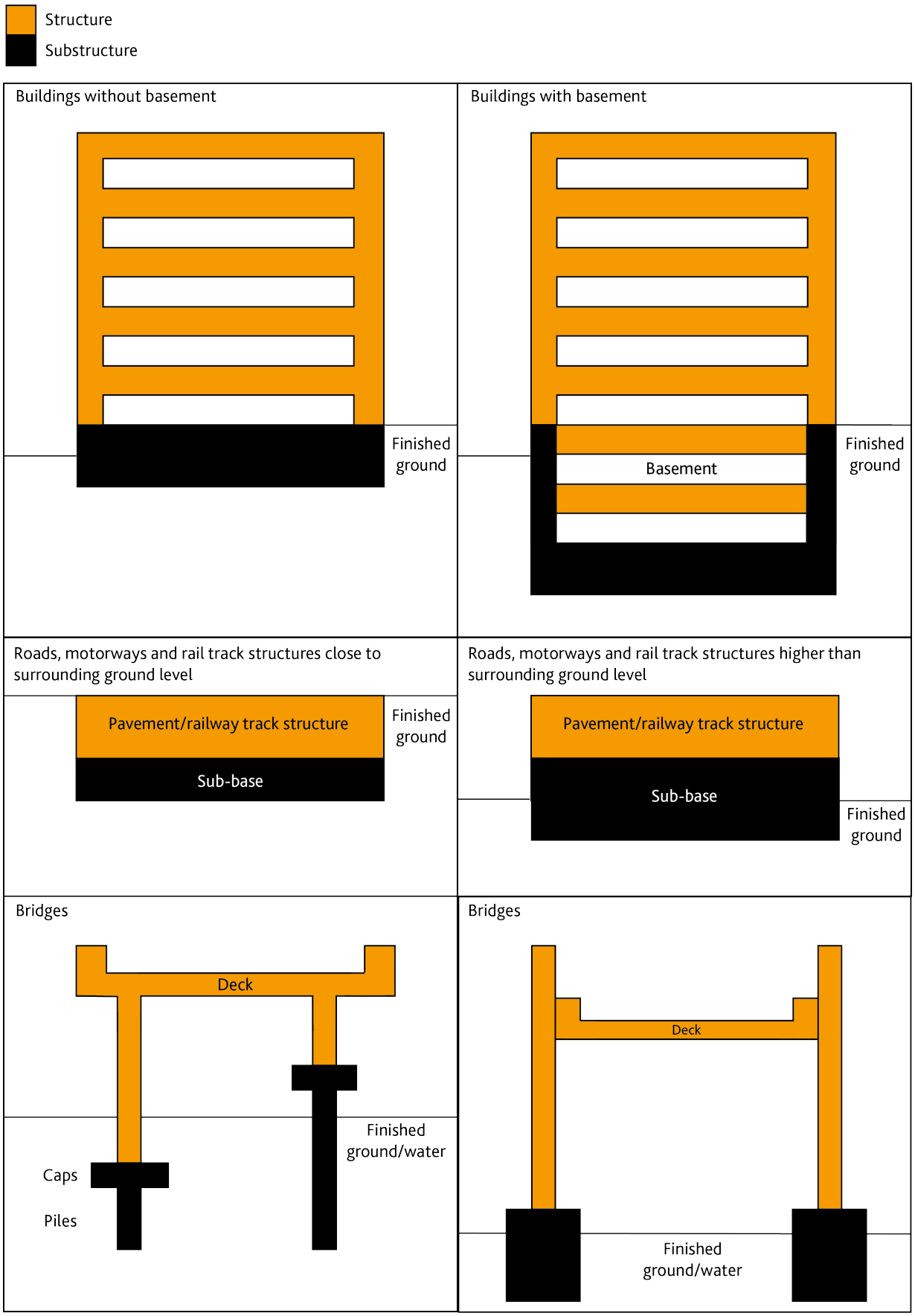
Service Provider: Any organisation or individual providing advice or a service to a Client at any point in a Project's life including, but not limited to, project managers, architects, engineers, technical architects or engineers, surveyors, Cost Management Professionals, constructors, facilities managers, planners, valuers, property managers, asset managers, agents and brokers.

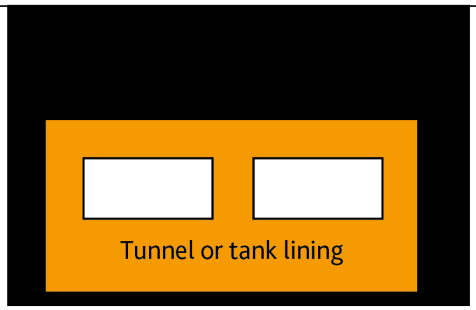
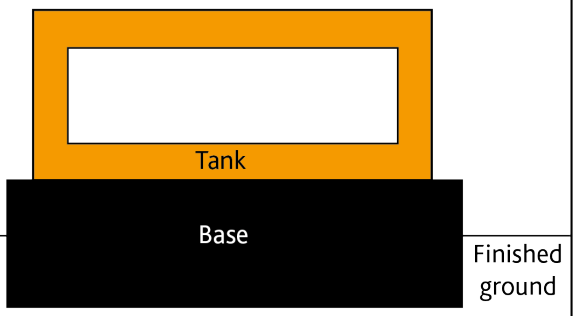
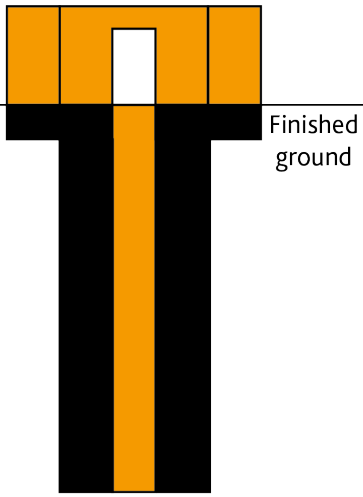
Sub-Project: A subdivision of a Project that can be described by a single set of attributes and values.

Taxes and Levies: Mandatory costs taxed or levied in connection with any phase of the Project by national governments, states, municipalities or governmental organisations, whether paid by the Client, the Constructor or the Operator.

4.2 Substructure and Structure Delineation

Figure 5: Substructure and Structure Delineation



<table>
<tr>
<td>Tunnels and tanks underground
 
</td>
<td>Tanks above ground
 
</td>
</tr>
<tr>
<td>Pipelines underground
 
</td>
<td>Pipelines above ground
 
</td>
</tr>
<tr>
<td>Wells and boreholes
 
</td>
<td>Waste water treatment works, water treatment works, power-generation plants, chemical plants and refineries

Use the same principles as illustrated above</td>
</tr>
</table>

Figure 6: Dams and Reservoirs

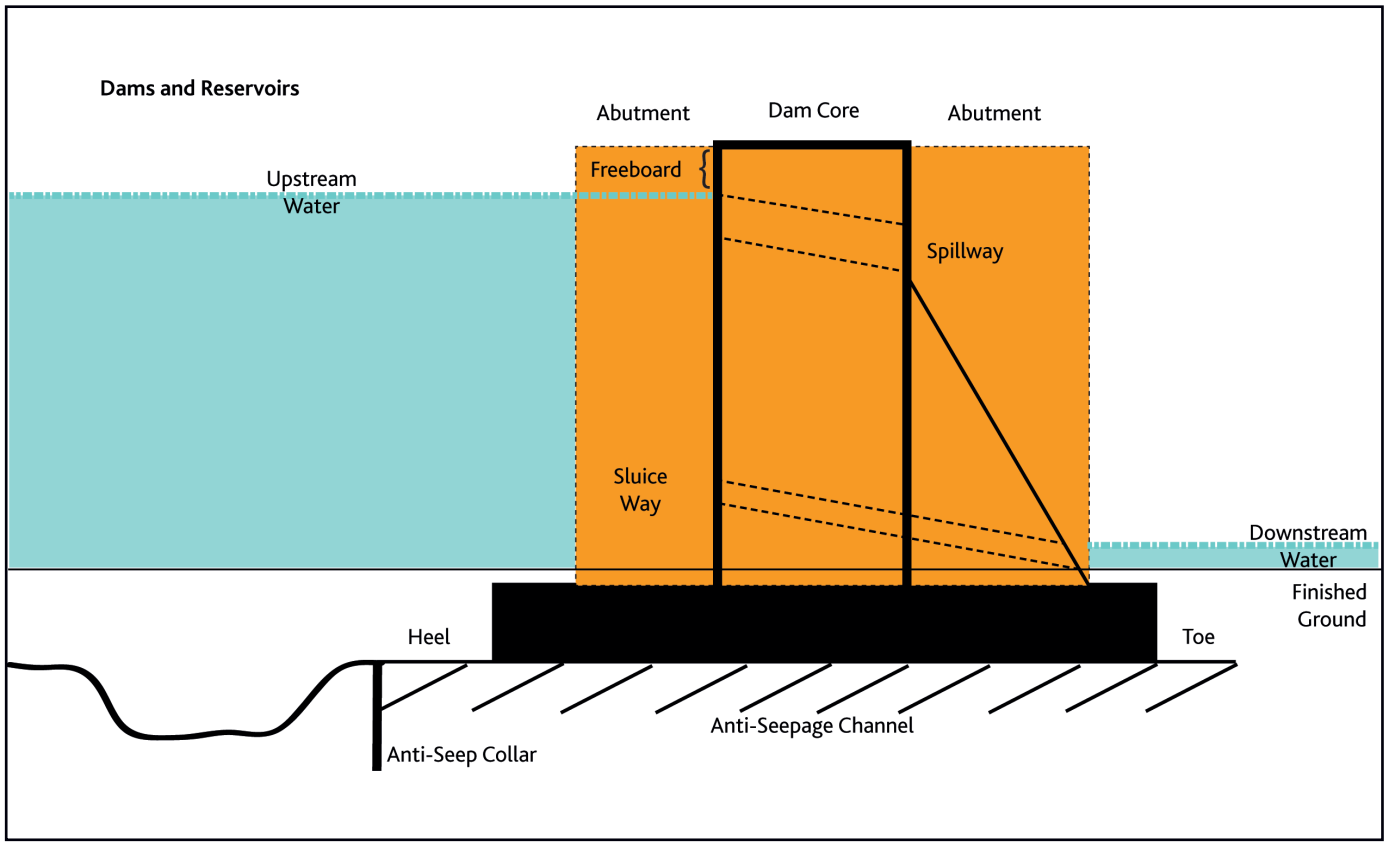
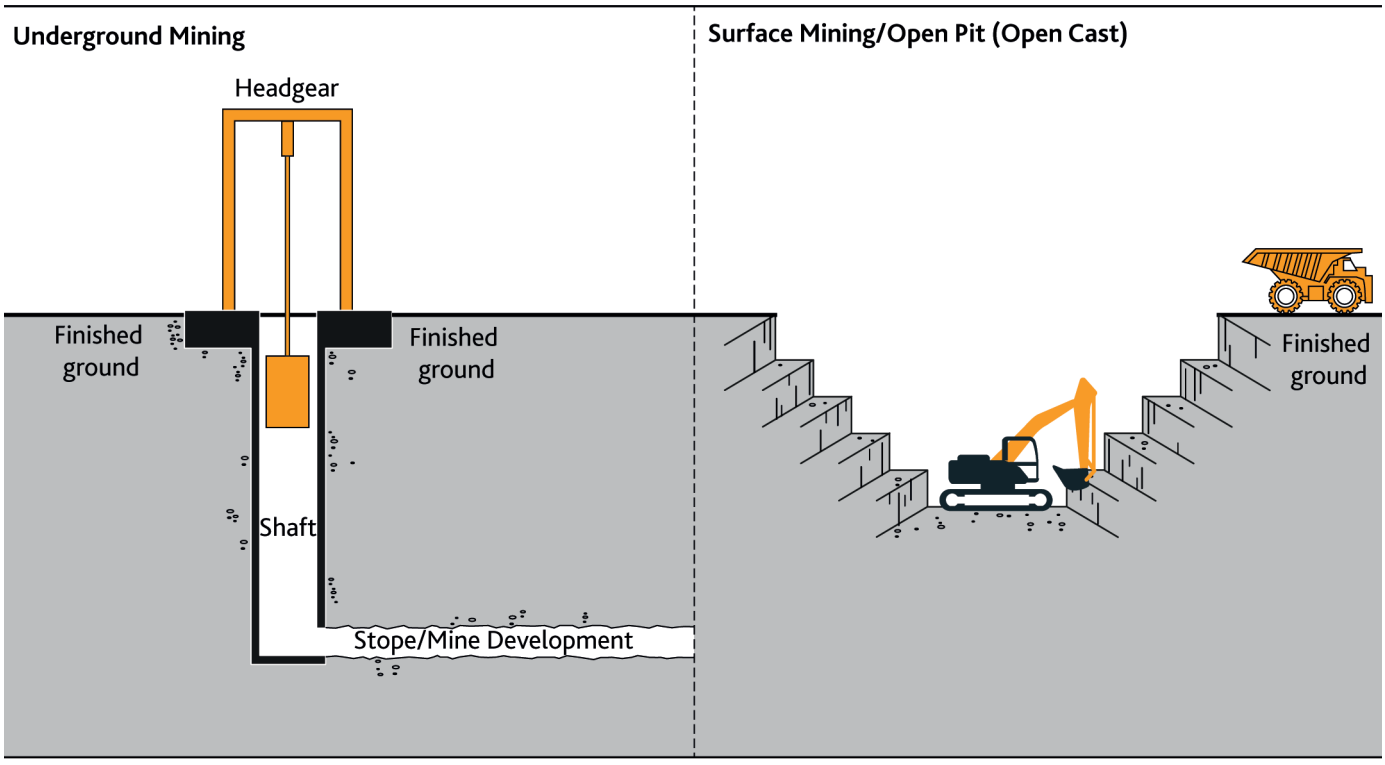


Figure 7: Mining



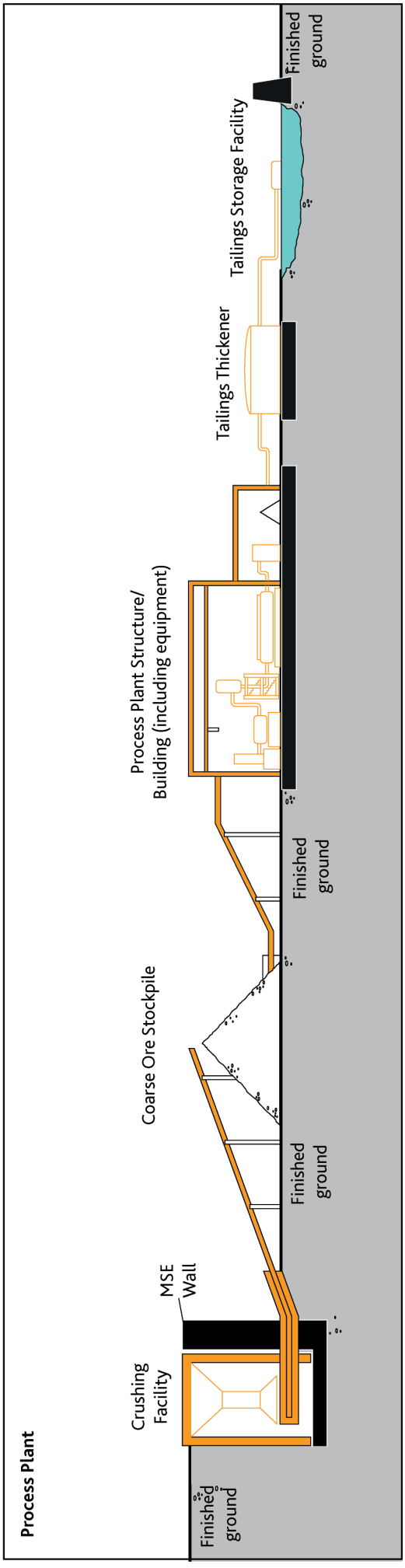


Figure 8: Process Plant

Appendices

General Notes

a. Accepted alternative terms are separated with a vertical slash (|). Numbered items under Cost Sub-Groups serve to illustrate the scope but without limitation.

b. In the case of projects where there are sub-projects, allocate costs to their most relevant Sub-Project, Cost Group and Cost Sub-Group as far as possible without omissions or duplications. Add a separate Sub-Project called 'Common' to capture costs that are common to all or most Sub-Projects and which should better be shown separately to permit reallocation in the appropriate way when the specific need arises.

c. Add a Cost Sub-Group 'All Other Costs' within the relevant Cost Group to take account of the costs of those Cost Sub-Groups whose value is insufficient to warrant a separate Cost Sub-Group (typically whose value is less than 5% of the relevant Cost Group). The Cost Code should end with '.999'.

d. All costs should represent those payable by the Client and include the payees' overheads and profits where applicable.

e. Include design fees payable by the Constructor under Construction | Renewal | Maintenance Costs in the Cost Group and Cost Sub-Group for which the design is provided, as much as possible, otherwise include in the 'Preliminaries | Constructors' site overheads | general requirements'.

f. Group costs of preparatory or enabling work with the principal items they are serving.

g. (1) Group costs of ancillary items, such as temporary lateral supports/temporary drainage/dewatering/slope treatment and protection for earthwork, falsework/formwork/reinforcement for concrete work, ironmongery/hardware, fixing accessories, inline fittings for pipes/drains/conduits/cables, painting/coating, spares, etc. with their principal items unless otherwise shown as a Cost Sub-Group. (2) Group costs of testing and commissioning with the relevant services. Include first-fill consumables. (3) Split costs of composite or prefabricated work into the relevant Cost Groups and Cost Sub-Groups as much as possible to facilitate cost analysis and comparison. (4) Include in the 'composite or prefabricated work' only if the composite or prefabricated work integrates different construction components across different Cost Groups and Cost Sub-Groups serving the functions of more than one Cost Sub-Group and is priced without further breakdown in contract.

h. Group costs of pre-treatment, pre-finishes and built-in components (including services and equipment) with their relevant composite or prefabricated work.

i. Round off costs suitably and commensurate with the accuracy of the amounts.

j. State 'Excluded' if the cost exists but is not reported. State 'N/A' (not applicable) if the cost does not exist.

k. Apportion the costs of cost code [2 | 3 | 5].08–[2 | 3 | 5].10 into cost code [2 | 3 | 5].01–[2 | 3 | 5].07 in case of simplified presentation.

l. As the Project develops, the Risk Allowances under cost code [2 | 3 | 5].09 may be gradually expended and the expended costs would be reflected in the costs of other items. The allowances may be explicitly shown in the Constructor's contract sum build-up or reserved in the Client's own budget not known to the Constructor. For cost reports on actual costs after construction, any surplus allowances should not be included.

m. The 'Design development allowance' under cost code [2 | 3 | 5].09 is an allowance in a pre-construction forecast estimate or cost plan for unforeseen extra costs due to the development of the design as it evolves. Once the design is complete, this allowance should become zero.

n. The 'Construction contingencies' under cost code [2 | 3 | 5].09 is an allowance for unforeseen extra costs during construction. Typically, it is to cover unforeseen events after awarding a construction contract. After the completion of the final account for the construction contract, this allowance should become zero.

o. Typically, a pre-construction cost estimate may be prepared based on the price level at a certain date, which may be current at the time of preparing the estimate or at an earlier base date, with or without allowance for the possible increases or decreases due to inflation or deflation during construction. A construction contract may be priced based on the price levels at a certain Base Date around the time of tendering and permit adjustments for rises or falls in the costs during construction. A provisional allowance should be made inside or outside the contract for the possible increase or decrease and should gradually be replaced with the actual outcome. The 'Price Level Adjustments' under cost code [2 | 3 | 5].09 are to allow for the aforesaid possible change until the time of tendering, and further change during construction.

Appendix A – Acquisition Costs Sub-Groups

Table A-1: Acquisition Costs Sub-Groups

Cost code	Description		Note
	Cost Category (Level 2)	AC	
	Cost Group (Level 3)		
	Cost Sub-Group (Level 4)		
1.	Acquisition Costs (AC) (each Cost Sub-Group includes Risks Allowances)		
01.	Site acquisition		
01.010	Costs and premium required to procure site		
01.020	Compensation to existing occupiers		
01.030	Demolition, removal and modification of existing properties by way of payment to existing owners instead of carrying out physical work		
01.040	Contributions for the preservation of heritage, culture and environment		
01.050	Related fees to agents, lawyers, and the like		
01.060	Related taxes and statutory charges		
02.	Administrative, finance, legal and marketing expenses		
02.010	Client's general office overheads		
02.020	Client's project-specific administrative expenses: 010 – in-house project management and design team 020 – supporting project staff 030 – project office venue, furniture and equipment if not included in Constructor's preliminaries | site overheads 040 – stores and workshops 050 – safety and insurances 060 – staff training 070 – accommodation and travelling expenses for in-house team and external parties		
02.030	Interest and finance costs		
02.040	Legal expenses		
02.050	Accounting expenses		
02.060	Sales, leasing, marketing, advertising and promotional expenses		
02.070	Taxes and statutory charges related to sales and lease		
02.080	License and permit charges for operation and use		

Appendix B – Construction | Renewal | Maintenance Costs Sub-Groups: Buildings

Table B-1: Construction | Renewal | Maintenance Costs Sub-Groups: Buildings

Cost code	Description			Note
	Cost Category (Level 2)	CC	RC or MC	
	Cost Group (Level 3)			
	Cost Sub-Group (Level 4)			
2.	Construction Costs (CC)			
3.	Renewal Costs (RC)			
5.	Maintenance Costs (MC)			
	(CC, RC, and MC share the same Cost Groups below, so far as applicable. Those separated by '|' in [ ] are respective alternative terms.)			
01.	Demolition, site preparation and formation			
01.010	Site survey and ground investigation			
01.020	Environmental treatment			
01.030	Sampling of hazardous or useful materials or conditions			
01.040	Temporary fencing			
01.050	Demolition of existing buildings and support to adjacent structures			
01.060	Site surface clearance (clearing, grubbing, topsoil stripping, tree felling, minor earthwork, removal)			
01.070	Tree transplant			
01.080	Site formation and slope treatment			
01.090	Temporary surface drainage and dewatering			
01.100	Temporary protection, diversion and relocation of public utilities			
01.110	Erosion control			
02.	Substructure			
02.010	Foundation piling and underpinning: 010 – mobilisation and demobilisation 020 – trial piles and caisson 030 – permanent piles and caisson 040 – pile and caisson testing 050 – underpinning			

Cost code	Description			Note
	Cost Category (Level 2)	CC	RC or MC	
	Cost Group (Level 3)			
	Cost Sub-Group (Level 4)			
02.020	Foundations up to top of lowest floor slabs: 010 – excavation and disposal 020 – lateral supports 030 – raft footings, pile caps, column bases, wall footings, strap beams, tie beams 040 – substructure walls and columns 050 – lowest floor slabs and beams (excluding basement bottom slabs) 060 – lift pits 070 – composite or prefabricated work			
02.030	Basement sides and bottom: 010 – excavation and disposal 020 – lateral supports 030 – bottom slabs and blinding 040 – sides 050 – vertical waterproof tanking, drainage blanket, drains and skin wall 060 – horizontal waterproof tanking, drainage blanket, drains and topping slab 070 – insulation 080 – lift pits, sump pits, sleeves 090 – composite or prefabricated work			
03.	Structure			
03.010	Structural removal and alterations			

Cost code	Description			Note
	Cost Category (Level 2)	CC	RC or MC	
	Cost Group (Level 3)			
	Cost Sub-Group (Level 4)			
03.020	Basement suspended floors (up to top of ground floor slabs): 010 – structural walls and columns 020 – beams and slabs 030 – staircases			
03.030	Frames and slabs (above top of ground floor slabs): 010 – structural walls and columns 020 – upper floor beams and slabs 030 – roof beams and slabs 040 – staircases 050 – fireproofing to steel structure			
03.040	Tanks, pools, sundries			
03.050	Composite or prefabricated work			
04.	Architectural works | Non-structural works			
04.010	Non-structural removal and alterations			
04.020	External elevations: 010 – non-structural external walls and features 020 – external wall finishes except cladding 030 – facade cladding and curtain walls 040 – external windows 050 – external doors 060 – external shop fronts 070 – roller shutters and fire shutters			

Cost code	Description			Note
	Cost Category (Level 2)	CC	RC or MC	
	Cost Group (Level 3)			
	Cost Sub-Group (Level 4)			
04.030	Roof finishes, skylights and landscaping (including waterproofing and insulation): 010 – roof finishes 020 – skylights 030 – other roof features 040 – roof landscaping (hard and soft)			
04.040	Internal divisions: 010 – non-structural internal walls and partitions 020 – shop fronts 030 – toilet cubicles 040 – moveable partitions 050 – cold rooms 060 – internal doors 070 – internal windows 080 – roller shutters and fire shutters 090 – sundry concrete work			

Cost code	Description			Note
	Cost Category (Level 2)	CC	RC or MC	
	Cost Group (Level 3)			
	Cost Sub-Group (Level 4)			
04.050	Fittings and sundries: 010 – balustrades, railings and handrails 020 – staircases and catwalk not forming part of the structure, cat ladders 030 – cabinets, cupboards, shelves, counters, benches, notice boards, blackboards 040 – exit signs, directory signs 050 – window and door dressings 060 – decorative features 070 – interior landscaping 080 – access panels, fire service cabinets 090 – sundries			
04.060	Finishes under cover: 010 – floor finishes (internal and external) 020 – internal wall finishes and cladding 030 – ceiling finishes and false ceilings (internal or external)			
04.070	Builder's work in connection with services: 010 – plinth, bases 020 – fire-proofing enclosure 030 – hoisting beams, lift pit separation screens, lift shaft separator beams 040 – suspended manholes 050 – cable trenches, trench covers 060 – sleeves, openings and the like not allowed for in 'Fittings and sundries'			
04.080	Composite or prefabricated work			

Cost code	Description			Note
	Cost Category (Level 2)	CC	RC or MC	
	Cost Group (Level 3)			
	Cost Sub-Group (Level 4)			
05.	Services and equipment			
05.010	Heating, ventilating and air-conditioning systems/air conditioners: 010 – seawater system 020 – cooling water system 030 – chilled water system 040 – heating water system 050 – steam and condensate system 060 – fuel oil system 070 – water treatment 080 – air handling and distribution system 090 – condensate drain system 100 – unitary air-conditioning system 110 – mechanical ventilation system 120 – kitchen ventilation system 130 – fume and smoke extraction system 140 – anaesthetic gas-extraction system 150 – window and split-type air conditioners 160 – air-curtains 170 – fans 180 – related electrical and control systems 190 – submissions, testing and commissioning			

Cost code	Description			Note
	Cost Category (Level 2)	CC	RC or MC	
	Cost Group (Level 3)			
	Cost Sub-Group (Level 4)			
05.020	Electrical services: 010 – high-voltage transformers and switchboards 020 – incoming mains, low-voltage transformers and switchboards 030 – mains and submains 040 – standby system 050 – lighting and power 060 – uninterruptible power supply 070 – electric underfloor heating 080 – local electrical heating units 090 – earthing/lightning protection and bonding 100 – submissions, testing and commissioning			
05.030	Fitting out lighting fittings			
05.040	Extra low voltage electrical services: 010 – information and communications technology system 020 – staff paging/location 030 – public address system 040 – building automation 050 – security and alarm 060 – close circuit television 070 – communal aerial broadcast distribution and the like 080 – submissions, testing and commissioning			

Cost code	Description			Note
	Cost Category (Level 2)	CC	RC or MC	
	Cost Group (Level 3)			
	Cost Sub-Group (Level 4)			
05.050	Water supply and drainage above ground or inside basement: 010 – cold water supply 020 – hot water supply 030 – flushing water supply 040 – grey water supply 050 – cleansing water supply 060 – irrigation water supply 070 – rainwater disposal 080 – soil and waste disposal 090 – planter drainage disposal 100 – kitchen drainage disposal 110 – related electrical and control systems 120 – submissions, testing and commissioning			
05.060	Supply of sanitary fittings and fixtures (installation included in 'Water supply and above ground drainage' unless not separable from costs of 'Fittings and sundries')			
05.070	Disposal systems: 010 – refuse 020 – laboratory waste 030 – industrial waste 040 – incinerator 050 – submissions, testing and commissioning			

Cost code	Description			Note
	Cost Category (Level 2)	CC	RC or MC	
	Cost Group (Level 3)			
	Cost Sub-Group (Level 4)			
05.080	Fire services: 010 – fire hydrant and hose reel system 020 – wet risers 030 – sprinkler system 040 – deluge system 050 – gaseous extinguishing system 060 – foam extinguishing system 070 – audio/visual advisory system 080 – automatic fire alarm and detection system 090 – portable hand-operated appliances and sundries 100 – related electrical and control systems 110 – submissions, testing and commissioning			
05.090	Gas services: 010 – coal gas 020 – natural gas 030 – liquid petroleum gas 040 – medical gas/laboratory gas 050 – industrial gas/compressed air/instrument air 060 – vacuum 070 – steam 080 – submissions, testing and commissioning			

Cost code	Description			Note
	Cost Category (Level 2)	CC	RC or MC	
	Cost Group (Level 3)			
	Cost Sub-Group (Level 4)			
05.100	Movement systems: 010 – lifts | elevators 020 – platform lifts 030 – escalators 040 – travellators | moving walkways 050 – conveyors 060 – submissions, testing and commissioning			
05.110	Gondolas			
05.120	Turntables			
05.130	Generators			
05.140	Energy-saving features			
05.150	Water and waste water treatment equipment			
05.160	Fountains, pools and filtration plant			
05.170	Powered building signage			
05.175	Audio/visual entertainment system			
05.180	Kitchen equipment			
05.190	Cold room equipment			
05.200	Laboratory equipment			
05.210	Medical equipment			
05.220	Hotel equipment			
05.230	Car park or entrances access control			
05.240	Domestic appliances			
05.250	Other specialist services			
05.260	Builder's profit and attendance on services			
06.	Surface and underground drainage			
06.010	Surface water drainage			
06.020	Storm water drainage			
06.030	Foul and waste water drainage			
06.040	Drainage disconnections and connections			
06.050	CCTV inspection of existing or new drains			
06.060	Buried Process Pipe			
07.	External and ancillary works			
07.010	Permanent retaining structures			

Cost code	Description			Note
	Cost Category (Level 2)	CC	RC or MC	
	Cost Group (Level 3)			
	Cost Sub-Group (Level 4)			
07.020	Site enclosures and divisions			
07.030	Ancillary structures			
07.040	Roads and paving			
07.050	Landscaping (hard and soft)			
07.060	Fittings and equipment			
07.070	External services: 010 – water supply 020 – gas supply 030 – power supply 040 – communications supply 050 – external lighting 060 – utility disconnections and connections			
08.	Preliminaries | Constructors' site overheads | general requirements			(j)
08.010	Construction management including site management staff and support labour			
08.020	Temporary access roads and storage areas, traffic management and diversion (at the Constructors' discretion)			
08.030	Temporary site fencing and securities			
08.040	Commonly shared construction plant			
08.050	Commonly shared scaffolding			
08.060	Other temporary facilities and services			
08.070	Technology and communications: telephone, broadband, hardware, software			
08.080	Constructor's submissions, reports and as-built documentation			
08.090	Quality monitoring, recording and inspections			
08.100	Safety, health and environmental management			
08.110	Insurances, bonds, guarantees and warranties			
08.120	Constructor's statutory fees and charges			
08.130	Testing and commissioning			
09.	Risk Allowances			(j), (k)
09.010	Design development allowance			(l)
09.020	Construction contingencies			(m)

Cost code	Description			Note
	Cost Category (Level 2)	CC	RC or MC	
	Cost Group (Level 3)			
	Cost Sub-Group (Level 4)			
09.030	Price Level Adjustments: 010 – until tendering 020 – during construction			(n)
09.040	Exchange rate fluctuation adjustments			
10.	Taxes and Levies			(j)
10.010	Paid by the Constructor			
10.020	Paid by the Client in relation to the construction contract payments			
11.	Work and utilities off-site (including related risk allowances, taxes and levies)			
11.010	Connections to, diversion of and capacity enhancement of public utility mains or sources off-site up to mains connections on-site: 010 – electricity 020 – transformers 030 – water 040 – sewer 050 – gas 060 – telecommunications			
11.020	Public access roads and footpaths			
12.	Post-completion loose furniture, fittings and equipment (including related risk allowances, taxes and levies)			
12.010	Production, process, operating and loose furniture, furnishing and equipment not normally provided before completion of construction			

Cost code	Description			Note
	Cost Category (Level 2)	CC	RC or MC	
	Cost Group (Level 3)			
	Cost Sub-Group (Level 4)			
13.	Construction-related consultants and supervision (including related risk allowances, taxes and levies)			
13.010	Consultants' fees and reimbursable: 010 – architects (architectural, landscape, interior design, technical, etc.) 020 – engineers (geotechnical, civil, structural, mechanical, electrical and plumbing, technical, etc.) 030 – project managers 040 – surveyors (quantity surveying, land surveying, building surveying, cost engineering, etc.) 050 – specialist consultants (environmental, traffic, acoustic, facade, BIM, etc.) 060 – value management studies			
13.020	Charges and levies payable to statutory bodies or their appointed agencies (in connection with planning, design, tender and contract approvals, supervision and acceptance inspections)			
13.030	Site supervision charges (including their accommodation and travels)			
13.040	Payments to testing authorities or laboratories			

Appendix C – Construction | Renewal | Maintenance Costs Sub-Groups: Civil Engineering Works

A bullet indicates that the Cost Sub-Group is likely to apply. Cost Sub-Groups without a bullet can also be included if applicable.

Table C-1: Construction | Renewal | Maintenance Costs Sub-Groups: Civil Engineering Works

Cost code	Description Cost Category (Level 2) CC / RC or MC	Roads, runways and motorways	Railways	Bridges	Tunnels	Waste water treatment works	Water treatment works	Pipelines	Wells and boreholes	Power generating plants	Chemical plants	Refineries	Dams and reservoirs	Mines and quarries	Note
	Cost Category (Level 2)														
	Cost Group (Level 3)														
	Cost Sub-Group (Level 4)														
2.	Construction Costs (CC)														
3.	Renewal Costs (RC)														
5.	Maintenance Costs (MC)														
	(CC, RC, and MC share the same Cost Groups below, so far as applicable. Those separated by '|' in [ ] are alternative terms for respective Cost Groups)														
01.	Demolition, site preparation and formation														
01.010	Site survey and ground investigation	•	•	•	•	•	•	•	•	•	•	•	•	•	
01.020	Environmental treatment	•	•	•	•	•	•	•	•	•	•	•	•	•	
01.030	Sampling of hazardous or useful materials or conditions	•	•	•	•	•	•	•	•	•	•	•	•	•	
01.040	Temporary fencing	•	•	•	•	•	•	•	•	•	•	•	•	•	
01.050	Demolition of existing structures and support to adjacent structures	•	•	•	•	•	•	•	•	•	•	•	•	•	
01.060	Site surface clearance (clearing, grubbing, topsoil stripping, tree felling, minor earthwork, removal)	•	•	•	•	•	•	•	•	•	•	•	•	•	

Cost code	Description Cost Category (Level 2) CC / RC or MC	Roads, runways and motorways	Railways	Bridges	Tunnels	Waste water treatment works	Water treatment works	Pipelines	Wells and boreholes	Power generating plants	Chemical plants	Refineries	Dams and reservoirs	Mines and quarries	Note
	Cost Category (Level 2)														
	Cost Group (Level 3)														
	Cost Sub-Group (Level 4)														
01.070	Tree transplant	•	•	•	•	•	•	•	•	•	•	•	•	•	
01.080	General site formation and slope treatment	•	•	•	•	•	•	•	•	•	•	•	•	•	
01.090	Temporary surface drainage and dewatering	•	•	•	•	•	•	•	•	•	•	•	•	•	
01.100	Temporary access roads and storage areas (provided under an advance contract)	•	•	•	•	•	•	•	•	•	•	•	•	•	
01.110	Temporary protection, diversion and relocation of public utilities	•	•	•	•	•	•	•	•	•	•	•	•	•	
01.120	Erosion control	•	•	•	•	•	•	•	•	•	•	•	•	•	
02.	Substructure														
02.010	Embankments/cuttings	•	•	•	•								•	•	
02.020	Excavation, disposal and lateral supports (specifically to receive any substructure construction but excluding general site formation and slope treatment)	•	•	•	•	•	•	•	•	•	•	•	•	•	
02.030	Trenching	•	•	•	•	•	•	•	•	•	•	•	•	•	
02.040	Drilling/boring				•			•	•				•	•	
02.050	Piling/anchoring	•	•	•		•	•			•	•	•	•	•	
02.060	Structural backfill/ground remediation	•	•	•	•	•	•	•	•	•	•	•	•	•	
02.070	Earth-retaining structures	•	•	•	•								•	•	
02.080	Abutments/wing walls	•	•	•									•	•	
02.090	Pile caps/footings/bases (nearest to the ground level or water level if constructed in water)	•	•	•	•	•	•	•	•	•	•	•	•	•	
02.100	Sub-base to pavements and rail track structures	•	•											•	

Cost code	Description Cost Category (Level 2) CC / RC or MC	Roads, runways and motorways	Railways	Bridges	Tunnels	Waste water treatment works	Water treatment works	Pipelines	Wells and boreholes	Power generating plants	Chemical plants	Refineries	Dams and reservoirs	Mines and quarries	Note
	Cost Category (Level 2)														
	Cost Group (Level 3)														
	Cost Sub-Group (Level 4)														
02.110	Bases to supports for tanks, pipes, well heads and the like					•	•	•	•	•	•	•		•	
02.120	Beds and surrounds to underground pipes					•	•	•	•	•	•	•			
03.	Structure														
03.010	Piers and towers			•										•	
03.020	Suspension system			•										•	
03.030	Decks			•											
03.040	Bearings			•											
03.050	Tunnel lining				•									•	
03.060	Road/track base	•	•	•	•									•	
03.070	Pavement	•	•	•	•										
03.080	Service roads and approaches	•	•	•	•										
03.090	Parapets/edge treatment	•	•	•	•										
03.100	Main structures					•	•	•	•	•	•	•	•	•	
03.110	Tanks, rigs, storage containers and the like					•	•	•	•	•	•	•		•	
03.120	Supports for tanks, pipes and the like					•	•	•	•	•	•	•		•	
03.130	Civil pipework					•	•	•	•		•	•	•	•	
03.140	Valves and fittings					•	•	•	•		•	•	•	•	
04.	Non-structural works														
04.010	Non-structural removal and alterations	•	•	•	•	•	•	•	•	•	•	•	•	•	
04.020	Non-structural construction					•	•	•	•	•	•	•	•	•	
04.030	Running surface	•	•	•	•								•		
04.040	Signage, markings and the like	•	•	•	•								•	•	
04.050	Gantries and the like	•	•	•	•									•	
04.060	Safety facilities	•	•	•	•	•	•	•	•	•	•	•	•	•	

Cost code	Description Cost Category (Level 2) CC / RC or MC	Roads, runways and motorways	Railways	Bridges	Tunnels	Waste water treatment works	Water treatment works	Pipelines	Wells and boreholes	Power generating plants	Chemical plants	Refineries	Dams and reservoirs	Mines and quarries	Note
	Cost Category (Level 2)														
	Cost Group (Level 3)														
	Cost Sub-Group (Level 4)														
04.070	Barriers/rails and means of access	•	•	•	•	•	•	•	•	•	•	•	•	•	
04.080	Special equipment and fittings	•	•	•	•	•	•	•	•	•	•	•	•	•	
04.090	Interior landscaping	•	•	•	•	•	•	•	•	•	•	•	•	•	
04.100	Builders' work in connection with services	•	•	•	•	•	•	•	•	•	•	•	•	•	
05.	Services and equipment														
05.010	Mechanical systems	•	•	•	•	•	•	•	•	•	•	•	•	•	
05.020	Lighting systems	•	•	•	•	•	•	•	•	•	•	•	•	•	
05.030	Illuminations	•	•	•	•									•	
05.040	Low-voltage power supply	•	•	•	•	•	•	•	•	•	•	•		•	
05.050	High-voltage power supply	•	•	•	•	•	•	•	•	•	•	•		•	
05.060	Cables/cable trays	•	•	•	•	•	•	•	•	•	•	•	•	•	
05.070	Other electrical services	•	•	•	•	•	•	•	•	•	•	•	•	•	
05.080	Control systems and instrumentation	•	•	•	•	•	•	•	•	•	•	•	•	•	
05.090	Pipe racks/supports	•	•	•	•	•	•	•	•	•	•	•	•	•	
05.100	Water supply and drainage above ground or inside underground construction	•	•	•	•	•	•			•	•	•	•	•	
05.110	Fire services	•	•	•	•	•	•			•	•	•	•	•	
05.120	Movement systems: lifts/ elevators/ conveyors	•	•	•	•	•	•			•	•	•	•	•	
06.	Surface and underground drainage														
06.010	Surface water drainage	•	•	•	•	•	•	•	•	•	•	•	•	•	
06.020	Storm water drainage	•	•	•	•	•	•	•	•	•	•	•	•	•	
06.030	Foul and waste water drainage	•	•	•	•	•	•	•	•	•	•	•	•	•	
06.040	Pumping systems	•	•	•	•	•	•	•	•	•	•	•	•	•	
06.050	Drainage connections	•	•	•	•	•	•	•	•	•	•	•	•	•	

Cost code	Description Cost Category (Level 2) CC | RC or MC	Roads, runways and motorways	Railways	Bridges	Tunnels	Waste water treatment works	Water treatment works	Pipelines	Wells and boreholes	Power generating plants	Chemical plants	Refineries	Dams and reservoirs	Mines and quarries	Note
	Cost Category (Level 2)														
	Cost Group (Level 3)														
	Cost Sub-Group (Level 4)														
07.	External and ancillary works														
07.010	Site enclosures and divisions	•	•	•	•	•	•	•	•	•	•	•	•	•	
07.020	Ancillary structures	•	•	•	•	•	•	•	•	•	•	•	•	•	
07.030	Roads and paving (not amounting to a Sub-Project)	•	•	•	•	•	•	•	•	•	•	•	•	•	
07.040	Landscaping (hard and soft)	•	•	•	•	•	•	•	•	•	•	•	•	•	
07.050	Fittings and equipment	•	•	•	•	•	•	•	•	•	•	•	•	•	
08.	Preliminaries | Constructors' site overheads | general requirements														(j)
08.010	Construction management including site management staff and support labour	•	•	•	•	•	•	•	•	•	•	•	•	•	
08.020	Temporary access roads and storage areas, traffic management and diversion (at the Constructors' discretion)	•	•	•	•	•	•	•	•	•	•	•	•	•	
08.030	Temporary site fencing and securities	•	•	•	•	•	•	•	•	•	•	•	•	•	
08.040	Commonly shared construction plant	•	•	•	•	•	•	•	•	•	•	•	•	•	
08.050	Commonly shared scaffolding	•	•	•	•	•	•	•	•	•	•	•	•	•	
08.060	Other temporary facilities and services	•	•	•	•	•	•	•	•	•	•	•	•	•	
08.070	Technology and communications: telephone, broadband, hardware, software	•	•	•	•	•	•	•	•	•	•	•	•	•	

Cost code	Description Cost Category (Level 2) CC / RC or MC	Roads, runways and motorways	Railways	Bridges	Tunnels	Waste water treatment works	Water treatment works	Pipelines	Wells and boreholes	Power generating plants	Chemical plants	Refineries	Dams and reservoirs	Mines and quarries	Note
	Cost Category (Level 2)														
	Cost Group (Level 3)														
	Cost Sub-Group (Level 4)														
08.080	Constructor's submissions, reports and as-built documentation	•	•	•	•	•	•	•	•	•	•	•	•	•	
08.090	Quality monitoring, recording and inspections	•	•	•	•	•	•	•	•	•	•	•	•	•	
08.100	Safety, health and environmental management	•	•	•	•	•	•	•	•	•	•	•	•	•	
08.110	Insurances, bonds, guarantees and warranties	•	•	•	•	•	•	•	•	•	•	•	•	•	
08.120	Constructor's statutory fees and charges	•	•	•	•	•	•	•	•	•	•	•	•	•	
08.130	Testing and commissioning	•	•	•	•	•	•	•	•	•	•	•	•	•	
09.	Risk Allowances														(j), (k)
09.010	Design development allowance	•	•	•	•	•	•	•	•	•	•	•	•	•	(l)
09.020	Construction contingencies	•	•	•	•	•	•	•	•	•	•	•	•	•	(m)
09.030	Price level adjustments 010 – until tendering 020 – during construction	•	•	•	•	•	•	•	•	•	•	•	•	•	(n)
09.040	Exchange rate fluctuation adjustments	•	•	•	•	•	•	•	•	•	•	•	•	•	
10.	Taxes and Levies														(j)
10.010	Paid by the Constructors	•	•	•	•	•	•	•	•	•	•	•	•	•	

Cost code	Description Cost Category (Level 2) CC / RC or MC	Roads, runways and motorways	Railways	Bridges	Tunnels	Waste water treatment works	Water treatment works	Pipelines	Wells and boreholes	Power generating plants	Chemical plants	Refineries	Dams and reservoirs	Mines and quarries	Note
	Cost Category (Level 2)														
	Cost Group (Level 3)														
	Cost Sub-Group (Level 4)														
10.020	Paid by the Client in relation to the construction contract payments	•	•	•	•	•	•	•	•	•	•	•	•	•	
11.	Work and utilities off-site (including related risk allowances, taxes and levies)														
11.010	Connections to, diversion of and capacity enhancement of public utility mains or sources off-site up to mains connections on-site: 010 – electricity 020 – transformers 030 – water 040 – sewer 050 – gas 060 – telecommunications	•	•	•	•	•	•	•	•	•	•	•	•	•	
11.020	Public access roads and footpaths	•	•	•	•	•	•	•	•	•	•	•	•	•	

Cost code	Description Cost Category (Level 2) CC | RC or MC	Roads, runways and motorways	Railways	Bridges	Tunnels	Waste water treatment works	Water treatment works	Pipelines	Wells and boreholes	Power generating plants	Chemical plants	Refineries	Dams and reservoirs	Mines and quarries	Note
	Cost Category (Level 2)														
	Cost Group (Level 3)														
	Cost Sub-Group (Level 4)														
12.	Post-completion loose furniture, fittings and equipment (including related risk allowances, taxes and levies)														
12.010	Production, process, operating and loose furniture, furnishing and equipment not normally provided before completion of construction	•	•	•	•	•	•	•	•	•	•	•	•	•	

Cost code	Description Cost Category (Level 2) CC | RC or MC	Roads, runways and motorways	Railways	Bridges	Tunnels	Waste water treatment works	Water treatment works	Pipelines	Wells and boreholes	Power generating plants	Chemical plants	Refineries	Dams and reservoirs	Mines and quarries	Note
	Cost Category (Level 2)														
	Cost Group (Level 3)														
	Cost Sub-Group (Level 4)														
13.	Construction-related consultants and supervision (including related risk allowances, taxes and levies)														
13.010	Consultants' fees and reimbursable: 010 – architects (architectural, landscape, interior design, technical, etc.) 020 – engineers (geotechnical, civil, structural, mechanical, electrical and plumbing, technical, etc.) 030 – project managers 040 – surveyors (quantity surveying, land surveying, building surveying, cost engineering, etc.) 050 – specialist consultants (environmental, traffic, acoustic, facade, BIM, etc.) 060 – value management studies	.	.	.	.	.	.	.	.	.	.	.	.	.	

Cost code	Description Cost Category (Level 2) CC | RC or MC	Roads, runways and motorways	Railways	Bridges	Tunnels	Waste water treatment works	Water treatment works	Pipelines	Wells and boreholes	Power generating plants	Chemical plants	Refineries	Dams and reservoirs	Mines and quarries	Note
	Cost Category (Level 2)														
	Cost Group (Level 3)														
	Cost Sub-Group (Level 4)														
13.020	Charges and levies payable to statutory bodies or their appointed agencies (in connection with planning, design, tender and contract approvals, supervision and acceptance inspections)	•	•	•	•	•	•	•	•	•	•	•	•	•	
13.030	Site supervision charges (including their accommodation and travels)	•	•	•	•	•	•	•	•	•	•	•	•	•	
13.040	Payments to testing authorities or laboratories	•	•	•	•	•	•	•	•	•	•	•	•	•	

Appendix D – Operation Costs Sub-Groups

Table D-1: Operation Costs Sub-Groups

Cost code	Description	
	Cost Category (Level 2)	OC
	Cost Group (Level 3)	
	Cost Sub-Group (Level 4)	
4.	**Operation Costs (OC)**	
01.	Cleaning	
01.010	External cleaning (routine and periodic)	
01.020	Internal cleaning (routine and periodic)	
01.030	Specialist cleaning (define type)	
02.	Utilities	
02.010	Fuel (state type: gas/electricity/oil and other fuel sources)	
02.020	Water, drainage and sewerage	
03.	Waste management	
03.010	Waste collection and disposal	
03.020	Recycling and savage	
04.	Security	
04.010	Physical security	
04.020	Remote monitoring	
05.	Information and communications technology	
05.010	Communication systems	
05.020	Specialist technology / sensors	
06.	Operators' site overheads | general requirements	
06.010	Administration	
06.020	Property insurance	
07.	Risk Allowances	
07.010	Operation related (user definable)	
07.020	Contractual obligations	
08.	Taxes and Levies	
08.010	Taxes	
08.020	Levies	

Appendix E – End of Life Costs Sub-Groups

Table E-1: End of Life Costs Sub-Groups

Cost code	Description	
	Cost Category (Level 2)	EC
	Cost Group (Level 3)	
	Cost Sub-Group (Level 4)	
6.	**End of Life Costs (EC)**	
01.	Disposal inspection	
01.010	Dilapidations report	
01.020	Contractual handback obligations	
02.	Decommissioning and decontamination	
02.010	Shutdowns and decommissioning	
02.020	Decontamination	
03.	Demolition, reclamation and salvage	
03.010	Demolition	
03.020	Reclamation	
03.030	Salvage	
04.	Reinstatement	
04.010	Agreed reinstatement works	
04.020	Contractual obligations	
05.	Constructors' site overheads | general requirements	
05.010	Administration	
05.020	Overheads (project specific)	
06.	Risk Allowances	
06.010	End of life specific (user definable)	
06.020	Abnormal risks (user definable)	
07.	Taxes and Levies	
07.010	Taxes	
07.020	Levies	
07.030	Credit for grants	

Appendix F – Process Flow Charts

The process flow charts in this appendix provide the steps needed to present Life Cycle Costs for a Project, programme or portfolio.

Figure F-1: Step 1

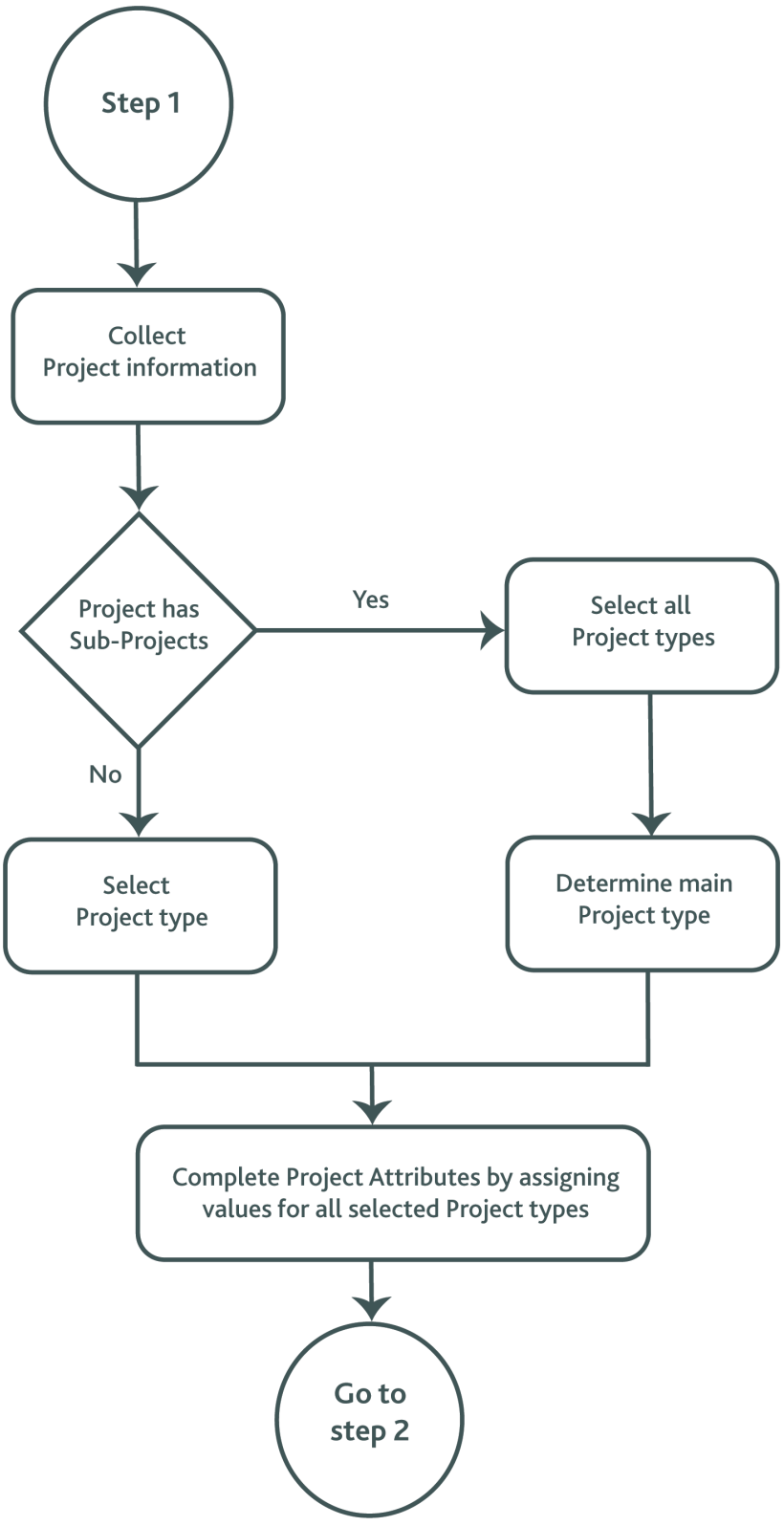
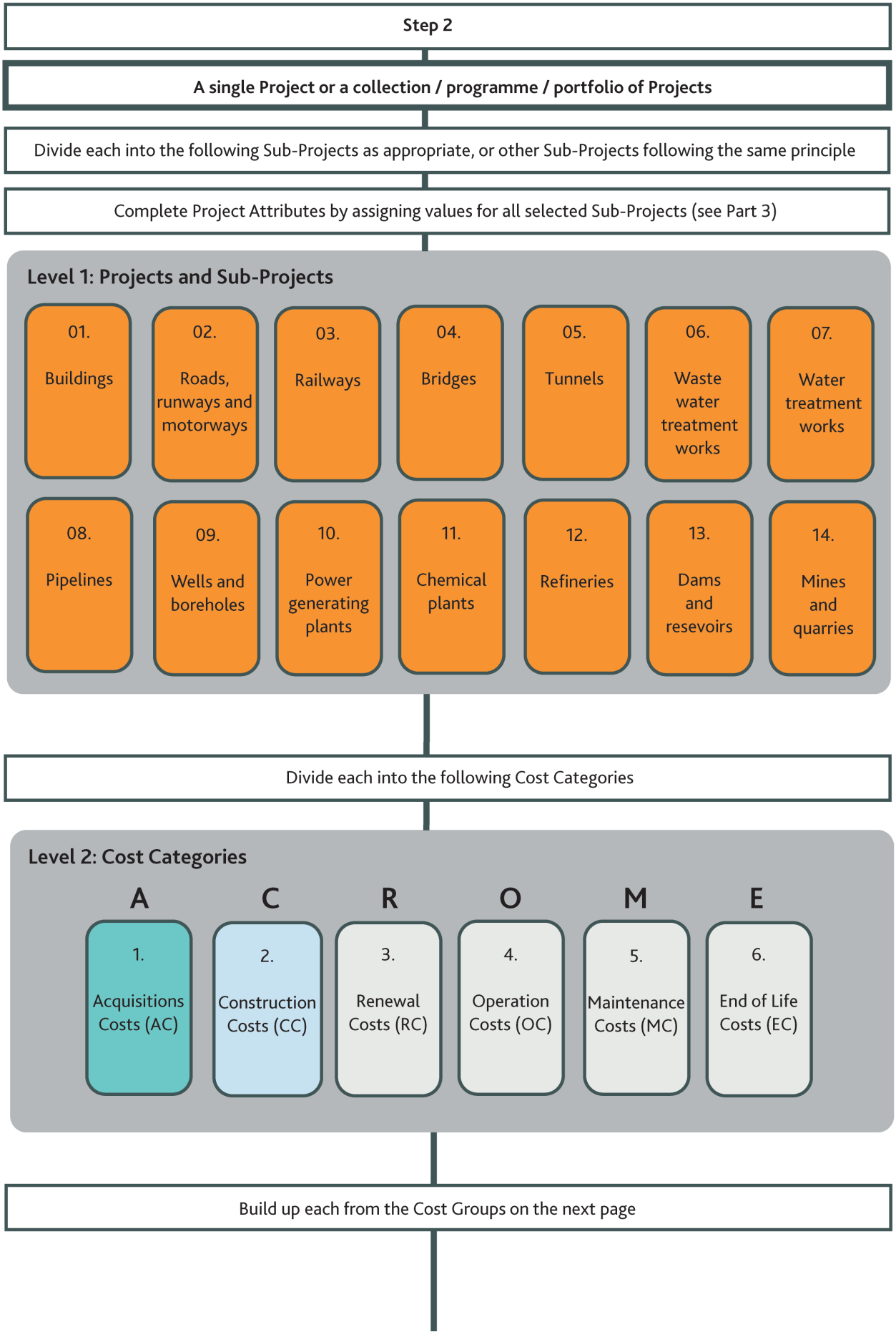
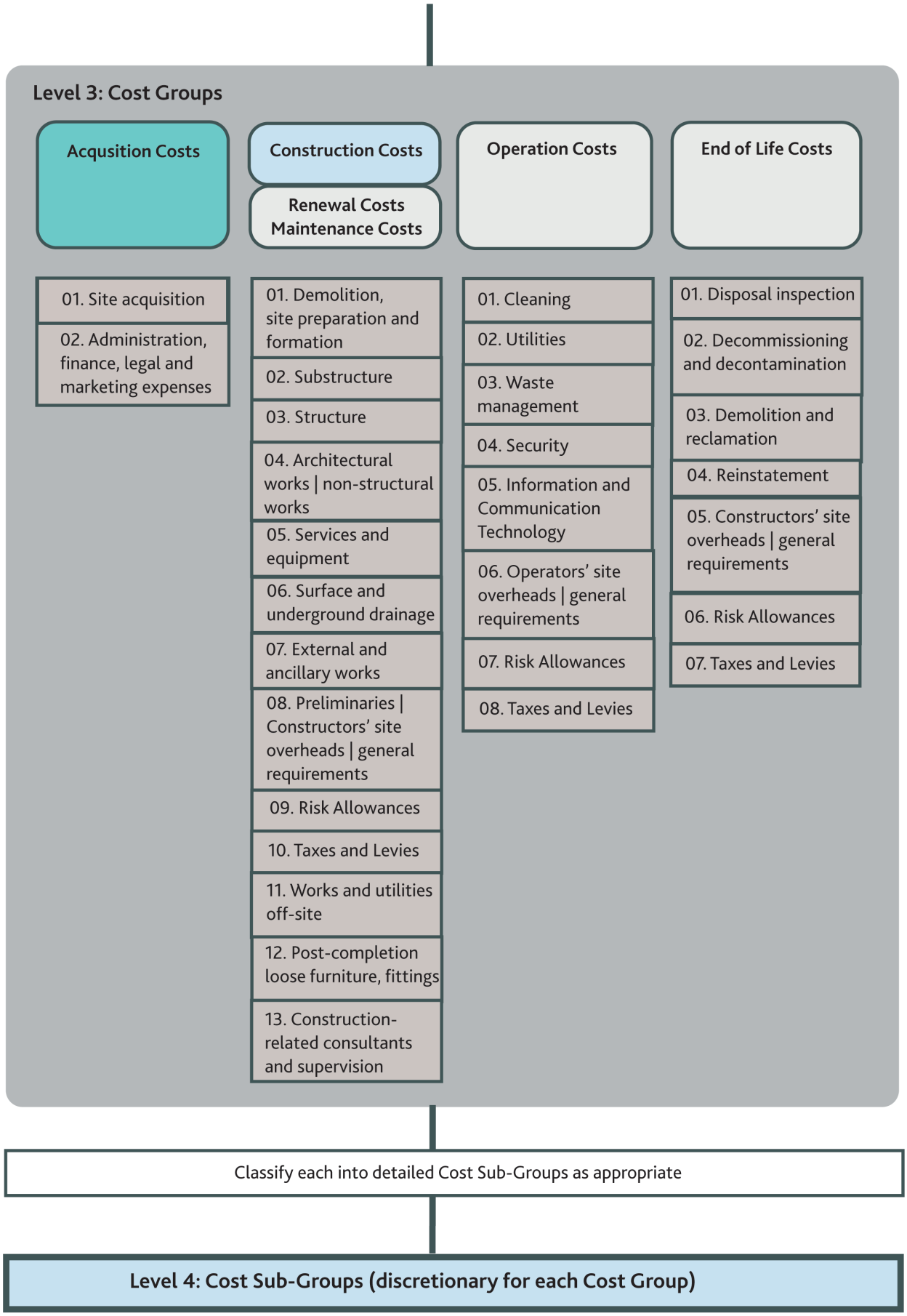


Figure F-2: Step 2




Level 3: Cost Groups
Acqusition Costs
Construction Costs
Renewal Costs
Maintenance Costs
Operation Costs
End of Life Costs
01. Site acquisition
02. Administration, finance, legal and marketing expenses
01. Demolition, site preparation and formation
02. Substructure
03. Structure
04. Architectural works | non-structural works
05. Services and equipment
06. Surface and underground drainage
07. External and ancillary works
08. Preliminaries | Constructors' site overheads | general requirements
09. Risk Allowances
10. Taxes and Levies
11. Works and utilities off-site
12. Post-completion loose furniture, fittings
13. Construction-related consultants and supervision
01. Cleaning
02. Utilities
03. Waste management
04. Security
05. Information and Communication Technology
06. Operators' site overheads | general requirements
07. Risk Allowances
08. Taxes and Levies
01. Disposal inspection
02. Decommissioning and decontamination
03. Demolition and reclamation
04. Reinstatement
05. Constructors' site overheads | general requirements
06. Risk Allowances
07. Taxes and Levies
Classify each into detailed Cost Sub-Groups as appropriate
Level 4: Cost Sub-Groups (discretionary for each Cost Group)

Appendix G – Reporting Templates

Specific notes for Appendix G

- Project Attributes and Values are not shown in this template but should be provided in the actual cost report.
- '$M' = $ million.

Grand Summary – mixed Project

Table G-1: Template for Grand Summary for a Mixed Project

- Bring all costs to the Common Date, which is assumed to be not earlier than the completion of construction.
- State whether the payments at the time of payment are based on Real Costs or Nominal Costs. Take this into account when determining the Discount Rate and discounting factors.
- <P>, <Q>, <R>, <S> are different numbers of years lapsed.
- <T> is number of years of annual payments.

Item	Description	AC	CC	RC	RC	RC	OC	MC	EC	Total Cost
	Years lapsed after construction to incur one-time payment			**<P>**	**<Q>**	**<R>**			**<S>**	
	Number of years of annual payments after construction						**<T>**	**<T>**		
A	**Project Qty and Discount Rate**									
1	Buildings	IPMS 1 (EXTERNAL) Floor Area (m^2)								
		IPMS 2 (INTERNAL) Floor Area (m^2)								
2	Roads, runways and motorways	Paved Area (m^2)								
3	Railways	Route Length (km)								
4	Bridges	Surface Area of Deck (m^2)								
5	Tunnels	Volume of Excavation (m^3)								
6	Dams and reservoirs	Reservoir capacity (million m^3)								
7	Common (insert Qty's Attribute of main Project Type (Principal Sub-Project))									
8	Others	Discount rate used (% per annum)								
B	**Total Cost $M brought to the Common Date (= D x E)**									
1	Buildings									
2	Roads, runways and motorways									
3	Railways									

Item	Description		AC	CC	RC	RC	RC	OC	MC	EC	Total Cost
	Years lapsed after construction to incur one-time payment				<P>	<Q>	<R>			<S>	
	Number of years of annual payments after construction							<T>	<T>		
4	Bridges										
5	Tunnels										
6	Dams and reservoirs										
7	Common										
8	**Total**										
C	**Unit cost $ / Project Qty (= B/A)**										
1	Buildings	IPMS 1 (EXTERNAL)									
		IPMS 2 (INTERNAL)									
2	Roads, runways and motorways										
3	Railways										
4	Bridges										
5	Tunnels										
6	Dams and reservoirs										
7	Common										
D	**One time or one annual payment $M at the time of payment**										
1	Buildings										
2	Roads, runways and motorways										
3	Railways										
4	Bridges										
5	Tunnels										
6	Dams and reservoirs										
7	Common										
E	**Discounting factor to bring one time or one annual payment from year of payment to the Common Date (using present value factor for RC and EC and present value in annuity factor for OC or MC)**										
1	Buildings										
2	Roads, runways and motorways										
3	Railways										
4	Bridges										
5	Tunnels										
6	Dams and reservoirs										
7	Common										

Construction Costs only – a Project

Table G-2: Template for Construction Costs only for a Project

- Add columns for unit costs calculated using additional Project Quantities, if required.
- Replace 'Qty' in '$/Qty' with the unit of the Project Quantity.
- The Project Quantity to be IPMS 1 (EXTERNAL) and IPMS 2 (INTERNAL) floor areas, paved area, route length, surface area of deck, volume of excavation, reservoir capacity, etc.
- Give totals in the heading row.

Cost code	Description	<Insert Project Type>		
		$M	$/Qty	%
	Project Quantity		(insert Qty)	
			(insert Qty's Attribute)	
2.	Construction Costs (CC)			100%
2.01.	Demolition, site preparation and formation			
2.02.	Substructure			
2.03.	Structure			
2.04.	Architectural works | non-structural works			
2.05.	Services and equipment			
2.06.	Surface and underground drainage			
2.07.	External and ancillary works			
2.08.	Preliminaries | Constructor's site overheads | general requirements			
2.09.	Risk Allowances			
2.10.	Taxes and Levies			
2.11.	Work and utilities off-site			
2.12.	Post-completion furniture, furnishing and equipment			
2.13.	Construction-related consultants and supervision			

Construction Costs only – a Building Project

Table G-3: Template for Construction Costs only for a Building Project

- Show unit costs per two Project Quantities, IPMS 1 (EXTERNAL) and IPMS 2 (INTERNAL) floor areas.

Cost code	Description	<insert Building Type>			
		$M	$/m²	$/m²	%
	Project Quantity		(insert area)	(insert area)	
			IPMS 1 (EXTERNAL) Floor Area (m²)	IPMS 2 (INTERNAL) Floor Area (m²)	
2.	Construction Costs (CC)				100%
2.01.	Demolition, site preparation and formation				
2.02.	Substructure				
2.03.	Structure				
2.04.	Architectural works | non-structural works				
2.05.	Services and equipment				
2.06.	Surface and underground drainage				
2.07.	External and ancillary works				
2.08.	Preliminaries | Constructor's site overheads | general requirements				
2.09.	Risk Allowances				
2.10.	Taxes and Levies				
2.11.	Work and utilities off-site				
2.12.	Post-completion furniture, furnishing and equipment				
2.13.	Construction-related consultants and supervision				

Total Capital Cost – a Project

Table G-4: Template for Total Capital Cost for a Project

- Give sub-totals and totals in the heading rows

Cost code	Description	<Insert Project Type>				
		$M	$/Qty	% by	% by Category	% of Total
	Project Quantity		(insert Qty)			
			(insert Qty's Attribute)			
	Total Capital Cost (AC+CC)					**100%**
1.	Acquisition Costs (AC)					
2.	Construction Costs (CC)					
1.	**Acquisition Costs (AC)**				100%	
1.01.	Site acquisition					
1.02.	Administrative, finance, legal and marketing expenses					
2.	**Construction Costs (CC)**				100%	
2.01.	Demolition, site preparation and formation					
2.02.	Substructure					
2.03.	Structure					
2.04.	Architectural works | non-structural works					
2.05.	Services and equipment					
2.06.	Surface and underground drainage					
2.07.	External and ancillary works					
2.08.	Preliminaries | Constructor's site overheads | general requirements					
2.09.	Risk Allowances					
2.10.	Taxes and Levies					
2.11.	Work and utilities off-site					
2.12.	Post-completion furniture, furnishing and equipment					
2.13.	Construction-related consultants and supervision					

Total Capital Cost – a Building Project

Table G-5: Template for Total Capital Cost for a Building Project

Cost code	Description	<Insert Building Type>				
		$M	$/m²	$/m²	% by Category	% of Total
	Project Quantity		(insert area)	(insert area)		
			IPMS 1 (EXTERNAL) Floor Area (m²)	IPMS 2 (INTERNAL) Floor Area (m²)		
	Total Capital Cost (AC+CC)					100%
1.	Acquisition Costs (AC)					
2.	Construction Costs (CC)					
1.	**Acquisition Costs (AC)**				100%	
1.01.	Site acquisition					
1.02.	Administrative, finance, legal and marketing expenses					
2.	**Construction Costs (CC)**				100%	
2.01.	Demolition, site preparation and formation					
2.02.	Substructure					
2.03.	Structure					
2.04.	Architectural works | non-structural works					
2.05.	Services and equipment					
2.06.	Surface and underground drainage					
2.07.	External and ancillary works					
2.08.	Preliminaries | Constructor's site overheads | general requirements					
2.09.	Risk Allowances					
2.10.	Taxes and Levies					
2.11.	Work and utilities off-site					
2.12.	Post-completion furniture, furnishing and equipment					
2.13.	Construction-related consultants and supervision					

Life Cycle Costs – a Project

Table G-6: Template for Life Cycle Costs for a Project

- $M NPV = $M as paid × Discounting Factor.
- $M as paid = amount at the time of payment.
- Discounting Factor should take into account the effect of different times of payments more than once.

Cost code	Description	<Insert Project Type>					
		$M as paid	Discounting Factor	$M NPV	$/Qty	% by Category	% of Total
	Project Quantity				(insert Qty)		
					(insert Qty's Attribute)		
	Life Cycle Cost (CC plus NPV of RC, OC, MC, and EC)						100%
1.	Acquisition Costs (AC) [Part of Non-Construction Costs]						
2.	Construction Costs (CC)						
3.	Renewal Costs (RC)						
4.	Operation Costs (OC)						
5.	Maintenance Costs (MC)						
6.	End of Life Costs (EC)						
1.	**Acquisition Costs (AC)**					100%	
1.01.	Site acquisition						
1.02.	Administrative, finance, legal and marketing expenses						
2.	**Construction Costs (CC)**					100%	
2.01.	Demolition, site preparation and formation						
2.02.	Substructure						
2.03.	Structure						
2.04.	Architectural works | non- structural works						
2.05.	Services and equipment						

Cost code	Description	<Insert Project Type>					
		$M as paid	Discounting Factor	$M NPV	$/Qty	% by Category	% of Total
	Project Quantity				(insert Qty)		
					(insert Qty's Attribute)		
2.06.	Surface and underground drainage						
2.07.	External and ancillary works						
2.08.	Preliminaries | Constructors' site overheads | general requirements						
2.09.	Risk Allowances						
2.10.	Taxes and Levies						
2.11.	Work and utilities off-site						
2.12.	Post-completion furniture, furnishing and equipment						
2.13.	Construction-related consultants and supervision						
3.	**Renewal Costs (RC)**					100%	
3.01.	Demolition, site preparation and formation						
3.02.	Substructure						
3.03.	Structure						
3.04.	Architectural works | non-structural works						
3.05.	Services and equipment						
3.06.	Surface and underground drainage						
3.07.	External and ancillary works						
3.08.	Preliminaries | Constructors' site overheads | general requirements						
3.09.	Risk Allowances						
3.10.	Taxes and Levies						

Cost code	Description	<Insert Project Type>					
		$M as paid	Discounting Factor	$M NPV	$/Qty	% by Category	% of Total
	Project Quantity				(insert Qty)		
					(insert Qty's Attribute)		
3.11.	Work and utilities off-site						
3.12.	Post-completion furniture, furnishing and equipment						
3.13.	Construction-related consultants and supervision						
4.	**Operation Costs (OC)**					100%	
4.01.	Cleaning						
4.02.	Utilities						
4.03.	Waste management						
4.04.	Security						
4.05.	Information and Communication Technology						
4.06.	Operators' site overheads | general requirements						
4.07.	Risks Allowances						
4.08.	Taxes and Levies						
5.	**Maintenance Costs (MC)**					100%	
5.01.	Demolition, site preparation and formation						
5.02.	Substructure						
5.03.	Structure						
5.04.	Architectural works | non- structural works						
5.05.	Services and equipment						
5.06.	Surface and underground drainage						
5.07.	External and ancillary works						

Cost code	Description	<Insert Project Type>					
		$M as paid	Discounting Factor	$M NPV	$/Qty	% by Category	% of Total
	Project Quantity				(insert Qty)		
					(insert Qty's Attribute)		
5.08.	Preliminaries | Constructors' site overheads | general requirements						
5.09.	Risk Allowances						
5.10.	Taxes and Levies						
5.11.	Work and utilities off-site						
5.12.	Post-completion furniture, furnishing and equipment						
5.13.	Construction-related consultants and supervision						
6.	**End of Life Costs (EC)**					100%	
6.01.	Disposal inspection						
6.02.	Decommissioning and decontamination						
6.03.	Demolition and reclamation						
6.04.	Reinstatement						
6.05.	Constructors' site overheads | general requirements						
6.06.	Risks Allowances						
6.07.	Taxes and Levies						

Life Cycle Costs – Column Headings for a Building Project

Table G-7: Template for Life Cycle Costs for a Building Project (Column Headings)

Cost code	Description	<Insert Building Type>						
		$M as paid	Discounting Factor	$M NPV	$/m²	$/m²	% by Category	% of Total
	Project Quantity				(insert area)	(insert area)		
					IPMS 1 (EXTERNAL) Floor Area (m²)	IPMS 2 (INTERNAL) Floor Area (m²)		

Use of More columns – Comparison Between Two Design Schemes

Table G-8: Template for Comparison Between Two Design Schemes for a Project

- Add columns for other schemes as appropriate.
- Only Construction Costs used for illustration.

Cost code	Description	Scheme A			Scheme B			B–A	
		$M	$/Qty	% of Total	$M	$/Qty	% of Total	$M	$/Qty
	Project Quantity		(insert Qty)			(insert Qty)			(insert Qty)
			(insert Qty's Attribute)			(insert Qty's Attribute)			(insert Qty's Attribute)
2.	Construction Costs (CC)			100%			100%		
2.01.	Demolition, site preparation and formation								
2.02.	Substructure								
2.03.	Structure								
2.04.	Architectural works | non-structural works								
2.05.	Services and equipment								
2.06.	Surface and underground drainage								
2.07.	External and ancillary works								

Cost code	Description	Scheme A			Scheme B			B–A	
		$M	$/Qty	% of Total	$M	$/Qty	% of Total	$M	$/Qty
	Project Quantity		(insert Qty)			(insert Qty)			(insert Qty)
			(insert Qty's Attribute)			(insert Qty's Attribute)			(insert Qty's Attribute)
2.08.	Preliminaries | Constructors' site overheads | general requirements								
2.09.	Risk Allowances								
2.10.	Taxes and Levies								
2.11.	Work and utilities off-site								
2.12.	Post-completion furniture, furnishing and equipment								
2.13.	Construction-related consultants and supervision								

Comparison Between Two Design Schemes – for a Building Project

Table G-9: Template for Comparison Between Two Design Schemes for a Building Project

Cost code	Description	Scheme A				Scheme B				B–A		
		$M	$/m²	$/m²	% of Total	$M	$/m²	$/m²	% of Total	$M	$/m²	$/m²
	Project Quantity											
			IPMS 1 (EXTERNAL) Floor Area (m²)	IPMS 2 (INTERNAL) Floor Area (m²)			IPMS 1 (EXTERNAL) Floor Area (m²)	IPMS 2 (INTERNAL) Floor Area (m²)			IPMS 1 (EXTERNAL) Floor Area (m²)	IPMS 2 (INTERNAL) Floor Area (m²)

Use of more columns – a Project Consisting of Various Parts

Table G-10: Template for a Project Consisting of Various Parts

- A 'part' may be:
  - a project within a collection, a programme, a portfolio, etc. of Projects; or
  - a Sub-Project of a Project; or
  - apartment blocks, hotel blocks, and external works of a mixed development; or
  - basement, podium, and tower of a building; or
  - a phase or contract package of a Project; or
  - in-situ construction and prefabricated construction of a Project; or
  - any other sub-division to suit the need of the Project.
- Add a set of columns for 'Common' before the 'Total' to show the costs that may be commonly shared by all or most parts, and worthwhile to be shown separately for the time being to permit reallocation in the appropriate way when the need arises.
- Use landscape paper as appropriate.
- Only Construction Costs used for illustration.

Cost code	Description	Part A			Part B			Common			Total	
		$M	$/Qty	% of Total	$M	$/Qty	% of Total	$M	$/Qty	% of Total	$M	$/Qty
	Project Quantity		(insert Qty)			(insert Qty)			(insert Qty)			(insert Qty)
			(insert Qty's Attribute)			(insert Qty's Attribute)			(insert Qty's Attribute)			(insert Qty's Attribute)
2.	Construction Costs (CC)			100%			100%			100%		
2.01.	Demolition, site preparation and formation											
2.02.	Substructure											
2.03.	Structure											
2.04.	Architectural works | non-structural works											
2.05.	Services and equipment											

Cost code	Description	Part A			Part B			Common			Total	
		$M	$/Qty	% of Total	$M	$/Qty	% of Total	$M	$/Qty	% of Total	$M	$/Qty
	Project Quantity		(insert Qty)			(insert Qty)			(insert Qty)			(insert Qty)
			(insert Qty's Attribute)			(insert Qty's Attribute)			(insert Qty's Attribute)			(insert Qty's Attribute)
2.06.	Surface and underground drainage											
2.07.	External and ancillary works											
2.08.	Preliminaries | Constructors' site overheads | general requirements											
2.09.	Risk Allowances											
2.10.	Taxes and Levies											
2.11.	Work and utilities off-site											
2.12.	Post-completion furniture, furnishing and equipment											
2.13.	Construction-related consultants and supervision											

Handling Two Currencies

Table G-11: Template for Handling Two Currencies

- Additional column may be added to show the conversion date.

Cost code	Description	<Insert Project Type>					
		Payment Currency A	Payment Currency B	Conversion Factor from A to B	Equivalent Currency A	Equivalent Currency A/Qty	%
	Project Quantity					(insert Qty)	
		A	B	C	A x C + B	(insert Qty's Attribute)	
2.	Construction Costs (CC)						100%
2.01.	Demolition, site preparation and formation						
2.02.	Substructure						
2.03.	Structure						
2.04.	Architectural works | non-structural works						
2.05.	Services and equipment						
2.06.	Surface and underground drainage						
2.07.	External and ancillary works						
2.08.	Preliminaries | Constructor's site overheads | general requirements						
2.09.	Risk Allowances						
2.10.	Taxes and Levies						
2.11.	Work and utilities off-site						
2.12.	Post-completion furniture, furnishing and equipment						
2.13.	Construction-related consultants and supervision						

Handling Many Currencies

Table G-12: Template for Handling Many Currencies

- Additional column may be added to show the conversion date.
- The 'check sum' rows are to be used to verify calculations.

Cost code	Description	<Insert Project Type>				
		Payment Currency	Conversion Factor to A	Equivalent Currency A	Equivalent Currency A/Qty	%
	Project Quantity				(insert Qty)	
		M	N	M x N	(insert Qty's Attribute)	
2.	Construction Costs (CC)					100%
2.01.	Demolition, site preparation and formation					
	Currency B					
2.02.	Substructure					
	Currency B					
2.03.	Structure					
	Currency B					
2.04.	Architectural works | non-structural works					
	Currency A					
	Currency B					
	Currency C					
2.05.	Services and equipment					
	Currency A					
	Currency B					
	Currency C					
2.06.	Surface and underground drainage					
	Currency B					
2.07.	External and ancillary works					
	Currency B					
2.08.	Preliminaries | Constructor's site overheads | general requirements					
	Currency A					
	Currency B					

Cost code	Description	<Insert Project Type>				
		Payment Currency	Conversion Factor to A	Equivalent Currency A	Equivalent Currency A/Qty	%
	Project Quantity				(insert Qty)	
		M	N	M x N	(insert Qty's Attribute)	
2.09.	Risk Allowances					
	Currency A					
2.10.	Taxes and Levies					
	Currency B					
2.11.	Work and utilities off-site					
	Currency B					
2.12.	Post-completion furniture, furnishing and equipment					
	Currency A					
	Currency B					
	Currency C					
2.13.	Construction-related consultants and supervision					
	Currency A					
	Currency B					
	Currency C					
	Check sum					
	Currency A					
	Currency B					
	Currency C					

Appendix H – ICMS Coding Structure

- Example Cost Code: 01.2.03.030 = Buildings: Construction Costs: Structure: Frames and slabs (above top of ground floor slabs)

Level 1: Projects and Sub-Projects

Table H-1: ICMS Cost Codes for Projects and Sub-Projects

01.	Buildings	08.	Pipelines
02.	Roads, runways and motorways	09.	Wells and boreholes
03.	Railways	10.	Power-generating plants
04.	Bridges	11.	Chemical plants
05.	Tunnels	12.	Refineries
06.	Waste water treatment works	13.	Dams and reservoirs
07.	Water treatment works	14.	Mines and quarries

Level 2: Cost Categories

Table H-2: ICMS Cost Codes for Cost Categories

1.	Acquisition Costs (AC) [Part of Non-Construction Costs]
2.	Construction Costs (CC)
3.	Renewal Costs (RC)
4.	Operation Costs (OC)
5.	Maintenance Costs (MC)
6.	End of Life Costs (EC)

Level 3: Acquisition Cost Groups

Table H-3: ICMS Cost Codes for Acquisition Costs Group

01.	Site acquisition
02.	Administrative, finance, legal and marketing expenses

Level 3: Construction | Renewal | Maintenance Costs Group

Table H-4: ICMS Cost Codes for Construction | Renewal | Maintenance Costs Group

01.	Demolition, site preparation and formation
02.	Substructure
03.	Structure
04.	Architectural works | Non-structural works
05.	Services and equipment
06.	Surface and underground drainage
07.	External and ancillary works
08.	Preliminaries | Constructors' site overheads | general requirements
09.	Risk Allowances
10.	Taxes and Levies
11.	Work and utilities off-site
12.	Post-completion loose furniture, fittings and equipment
13.	Construction | Renewal | Maintenance -related consultancies and supervision

Level 3: Operation Costs Group

Table H-5: ICMS Cost Codes for Operation Costs Group

01.	Cleaning
02.	Utilities
03.	Waste management
04.	Security
05.	Information and Communications Technology
06.	Operators' site overheads | general requirements
07.	Risk Allowances
08.	Taxes and Levies

Level 3: End of Life Costs Cost Group

Table H-6: ICMS Cost Codes for End of Life Costs Group

01.	Disposal inspection
02.	Decommissioning and decontamination
03.	Demolition and reclamation
04.	Reinstatement
05.	Constructors' site overheads | general requirements
06.	Risk Allowances
07.	Taxes and Levies

Code Codes have been suggested in Appendix A to E for Level 4 Cost Sub-Groups but these are discretionary.

Appendix I – Interface with International Property Measurement Standards (IPMS)

Measurement of Floor Areas for Buildings for ICMS Cost Reports

The various cost analysis standards worldwide require the measurement of a Gross Floor Area (either External (GEFA) or Internal (GIFA)) or similar variations thereof to permit the representation of overall costs in terms of currency per floor area. However, even though the use of these terms is commonly understood, the definitions and interpretations of these terms are also subject to considerable regional variations. Measurement guidelines and definitions vary considerably between countries.

Linking ICMS with IPMS provides a valuable tool for overcoming these inconsistencies. ICMS require a cost report to include both GEFA (IPMS 1 (EXTERNAL)) and GIFA (IPMS 2 (INTERNAL)) measured in accordance with the rules set out in IPMS. IPMS are evolving on a building-sector basis (offices, residential, retail, etc.). These rules are summarised below, but reference to the specific Standards for the building type is recommended.

IPMS 1 (EXTERNAL): Gross external floor area	IPMS 2 (INTERNAL): Gross internal floor area
Use	
IPMS 1 (EXTERNAL) is used for measuring the area of a building including External Walls. IPMS 1 (EXTERNAL) is a whole building measurement and is consistent for all building types.	IPMS 2 (INTERNAL) is a whole building measurement that is used for measuring the interior boundary area of a building. IPMS 2 (INTERNAL) is a whole building measurement and is consistent for all building types.
Selected Definitions	
IPMS 1 (EXTERNAL) is the total of the areas of each floor level of a Building measured to the outer perimeter of External Walls or other external construction features, Sheltered Areas and External Floor Areas. The definition for IPMS 1 (EXTERNAL) is the same for all classes of building.	IPMS 2 (INTERNAL) is total of the areas of each floor level of a building measured to the Internal Dominant Face of all External Walls and External Floor Areas on each level.
Balcony: An external platform at an upper floor level with a balustrade to the open sides projecting from or recessed from an External Wall and including in this definition **generally accessible rooftop terraces**.	
Balustrade: A protective barrier formed by a solid wall, railings or other features.	
Catwalk: An internal or external walkway above the surrounding area that provides higher level access.	
Covered Area: The extent of the area of a building covered by one or more roof(s) and the perimeter of which is sometimes referred to as the drip line, being the outermost permanent structural extension, exclusive of ornamental overhangs.	
External Wall: The enclosing element of a building, including windows and walls, that separates the exterior area from the interior area.	
Finished Surface: The wall surface directly above the horizontal wall-floor junction, ignoring skirting boards, cable trunking, heating and cooling units, and pipework.	
Floor Area: The area of a normally horizontal, permanent, load bearing structure for each level of a building.	
Internal Dominant Face (IDF): The inside surface area comprising more than 50% of the first 2.75 metres measured vertically from the floor, or to the ceiling if lower, for each IDF Wall Section. If such does not occur, then the Finished Surface is deemed to be the IDF.	

IPMS 1 (EXTERNAL): Gross external floor area	IPMS 2 (INTERNAL): Gross internal floor area
Loading Bay(s): Area(s) designed for vehicle access next to or adjacent to a Loading Dock.	
Loading Dock(s): Elevated platform(s) at an opening of a building designed for receiving or dispatching goods or equipment.	
Mezzanine: An intermediate or partial floor, other than a Catwalk, that is usually fully or partially open on one or more sides.	
Sheltered Area: Any part of the Covered Area that is not fully enclosed but excluding insignificant areas under the eaves.	
Structure: A construction that provides shelter or serves an ancillary function but is not necessarily fully enclosed.	
Temporary Structure: A physical element within a building installed on an interim or permanent basis, the removal of which would not damage the physical integrity of the building.	
Veranda: An open or partly enclosed area on the outside of a building at ground level (Level 0) and covered by a roof that is an integral part of the building.	
Inclusions	
• all areas, walls and pillars • enclosed walkways or passages between separate buildings, available for direct or indirect use • enclosed void areas such as atria – only included at their lowest floor level • exterior wall thickness of basement – estimated if there are no available plans for a basement • to follow the principal external perimeter line of the building across roller shutters and other openings	• all internal areas, including internal walls and pillars • enclosed void areas such as atria – only included at their lowest floor level
Measurements included (but each area must be stated separately)	
• External Floor Areas and Mezzanines – measured to the outside edge of the floor construction • Sheltered Areas – measured to the Covered Area • Verandas	• External Floor Areas and Mezzanines – measured to the inner face of the balustrade, but not beyond the outside edge of the floor construction • internal Loading Bays • enclosed walkways or passages between separate buildings, available for direct or indirect use

IPMS 1 (EXTERNAL): Gross external floor area	IPMS 2 (INTERNAL): Gross internal floor area
Exclusions (each area must be stated separately if measured)	
• Temporary Structures • open light wells or the upper level voids of an atrium • open external stairways that are not an integral part of the building, for example, an open framework fire escape • any Structure beyond the Covered Area • any other ground-level areas or structures beyond the Covered Area	• Same as IPMS 1 (EXTERNAL) • areas outside the External Wall such as Sheltered Areas and external Loading Bays • Sheltered Areas – measured to the Finished Surface of any walls or otherwise to the outer perimeter of the Covered Area

Appendix J – Revision Notes for ICMS, 2nd edition

- Expanded to incorporate the full scope of life cycle costs of Constructed Assets, adding Renewal Costs, Operation Costs, Maintenance Costs and End of Life Costs.
- Extended to include 'Dams and reservoirs', and 'Mines and quarries' as Project Types.
- 'Site Acquisition and Client's Other Costs' changed to 'Acquisition Costs'.
- Definition of 'Base Date' revised to match the General Notes in the Appendices.
- 'Capital Construction Costs' changed to 'Construction Costs'.
- Associated Capital Costs merged as Cost Groups under Construction Costs.
- Cost code assigned for Projects and Sub-Projects and renumbered for Cost Categories.
- 'major refurbishment' as a nature of Works changed to 'major adaptation'
- Delineation between above ground and underground drainage clarified.
- A note added to Part 3 (formerly Schedule 1) to clarify that some attributes are multi-valued requiring the entry of sets of sub-attributes and values.
- Project Attribute 'Ground conditions' qualified with 'predominant'.
- Project Attribute 'Seismic zones' added under Common Attributes.
- Life cycle cost related Project Attributes added under Common Attributes.
- Project Attribute 'Hotel grade' added for Buildings.
- Project Attribute 'shape (vertical section)' added for Buildings.
- Hardstandings included in the scope of Roads, runways and motorways.
- Project Attribute 'spans' for Bridges deleted.
- Project Attribute 'number each of abutments/piers/towers with foundations not in water' added for Bridges.
- Project Attribute 'number of shafts' added for Tunnels.
- Project Attribute 'number and diameter of each pipe' changed to 'length of each diameter of pipes' with corresponding change of Project Quantity for Pipelines.
- Project Attribute 'Length of pipes (sum of number x each length)' changed to 'Total length of pipes' for Pipelines.
- Project Attribute 'number of wellheads' changed to 'number of wells/boreholes' for Wells and boreholes.
- Project Attribute 'number of each diameter of drilled/bored holes' deleted from Wells and boreholes.
- Project Attribute 'vertical length drilled/bored (sum of number x each depth)' changed to 'length of each diameter of vertical drilled/bored wells/boreholes' with corresponding change of Project Quantity for Wells and boreholes.

- Project Attribute 'inclined or horizontal length drilled/bored (sum of number x each depth)' changed to 'length of each diameter of inclined or horizontal drilled/bored wells/boreholes' with corresponding change of Project Quantity for Wells and boreholes.
- Project Attribute 'Length of drilled/bored depth' changed to 'Total length drilled/bored' for Wells and boreholes.
- Note added that more than one pre-set option may be selected for Project Attribute 'principal processes' for Chemical plants.
- Order of Appendices adjusted.
- Appendices A to D expanded to Appendices A to E with subsequent Appendices re-numbered.
- Cost Sub-Group 'Site survey and investigation' changed to 'Site survey and ground investigation' to include ground investigation.
- Cost Sub-Group 'Sampling for construction, geophysical, geological or similar purposes' renamed as 'Sampling of hazardous or useful materials or conditions'.
- Cost Sub-Group 'Erosion control' added under 'Demolition, site preparation and formation'.
- Appendix H has been added to explicitly define the coding structure of the 2nd edition of ICMS.
- Item 'hoisting beams, lift pit separation screens' changed to 'hoisting beams, lift pit separation screens, lift shaft separator beams' under Builder's work in connection with services.
- Item 'communications' changed to 'information and communications technology system' under Extra Low Voltage Electrical Services.
- Cost Sub-Group 'Supply of sanitary fittings' changed to 'Supply of sanitary fittings and fixtures' with explanatory note added.
- Item 'portable hand-operated appliances' changed to 'portable hand-operated appliances and sundries' under Fire services.
- Cost Sub-Group 'Audio/visual entertainment system' added under Services and equipment Cost Category.
- Reporting Templates showing life cycle costs and currency conversion added.
- Interface with IPMS updated and tabulated.
- Bibliography updated.
- Colouring of tables revised.

Appendix K – Bibliography

International Standards

International Ethics Standards (IES): www.ies-coalition.org

International Land Measurement Standards (ILMS): www.ilmsc.org

International Property Measurement Standards (IPMS): www.ipmsc.org

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