ICMS Coalition (www.icms-coalition.org)

International Construction Measurement Standards

Global Consistency in Presenting Construction Costs

Private Consultation Draft
August 2016

Contents

Welcome to ICMS: Global Consistency in Presenting Construction Costs

ICMS aims to provide global consistency in classifying, defining, analysing and reporting construction costs at a project, regional and national level.

In this document the ICMS Coalition, currently 43 in number, presents the 'International Construction Measurement Standards: Global Consistency in Presenting Construction Costs'. This edition of the standards focuses on capital costs; however, there is provision to include life cycle costs in later editions.

This project is the first of its kind, bringing together numerous organisations from all over the world to create shared international standards for classifying, presenting and reporting construction costs.

There are many standards worldwide that are inconsistent and not always compatible. A consistent practice in construction cost management worldwide would bring significant benefits. The globalisation of construction business has prompted the need to make meaningful comparative analysis between countries, not least by international organisations such as the World Bank, the International Monetary Fund, the various regional development banks and the United Nations.

For this reason the ICMS Coalition has come together to create shared standards. At a meeting at the IMF in June 2015, Coalition members confirmed that they were committed to promoting the implementation of this standard to encourage world markets to accept and adopt ICMS as the primary standard for construction cost reporting.

Following this meeting an independent Standard Setting Committee (SSC) was formed. The SSC includes technical experts from 11 countries and a combined expertise covering 47 different markets. The SSC worked virtually and also gathered three times, once in Brussels and twice in London.

Various civil engineering, cost management, cost consultancy, cost engineering and quantity surveying institutions were represented on the Coalition and the SSC. They were generous in providing their national standards which provided the basis for the early deliberations of the SSC.

Completing a task of this magnitude should take many years. The SSC produced the complete consultation draft of ICMS within a year, in July 2016. After ending the private consultation period in October 2016, a public consultation took place between November 2016 and January 2017. The final standard was published in May 2017.

The Coalition accepts that standard setting is a continuous and dynamic process; it will be listening closely to the global construction cost management community to ensure necessary updates are captured for continued growth and improvement. In addition to preparing further ICMS standards for other civil engineering classes, the SSC will also monitor all guidance notes on ICMS to ensure that they are consistent with the principles and intent of ICMS. All local, regional or worldwide approaches will be well documented to allow coordination, expansion and consistency of ICMS guidance whenever required.

The Coalition is also beginning the important work of implementation: it is liaising with governments on a national, regional or state and local level to seek adoption of ICMS. Many other key stakeholders are being engaged in the process of implementation. A list of ICMS-supporting partners can be seen on the website www.icms-coaltion.org – these organisations are committed to the adoption of ICMS.

The Coalition, the SSC and the numerous participants in the consultation are proud to present ICMS.

For further information on ICMS please visit the website www.icms-coaltion.org.

Ken Creighton – Chair, Royal Institution of Chartered Surveyors

Martin Darley – Vice Chair, Association for the Advancement of Cost Engineering

Julie dela Cruz – General Secretary, Philippine Institute of Certified Quantity Surveyors

Craig Bye – General Secretary, Canadian Institute of Quantity Surveyors

Introduction

The International Construction Measurement Standards **Coalition** (**ICMSC**) was formed on 17 June 2015 after meeting at the International Monetary Fund (IMF) in Washington DC, USA. The **Coalition**, comprising the 43 organisations listed below at the date of publication, aims to bring about consistency of construction cost reporting standards internationally. This is achieved by the creation and adoption of an agreed international standard for the structuring and presentation of cost reports. This standard sets out a structure for describing construction in terms of project scope, attributes and values descriptors.

This document setting out the provisions of the standard is the first prepared by the **Coalition's** Standard Setting Committee (SSC). The **Coalition** members at the date of publication are:

Africa Association of Quantity Surveyors (AAQS)
Association for the Advancement of Cost Engineering (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 Institute of Quantity Surveyors (CIQS)
Chartered Institute of Building (CIOB)
Chartered Institution of Civil Engineering Surveyors (ICES)
China Electricity Council
China Engineering Cost Association (CECA)
Commonwealth Association of Surveying and Land Economy (CASLE)
Conseil Europeen des Economists 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)
Federation Internationale des Geometres (FIG)
Ghana Institution of Surveyors (GhIS)
Hong Kong Institute of Surveyors (HKIS)Ikatan Quantity Surveyors Indonesia (IQSI)
Indian Institute of Quantity Surveyors (IIQS)
Institute of Engineering and Technology (IET)
Institute of Quantity Surveyors of Kenya (IQSK)
Institution of Civil Engineers (ICE)
Institution of Surveyors Kenya (ISK)
International Cost Engineering Council (ICEC)
Italian Association for Total Cost Management (AICE)
Korean Institution of Quantity Surveyors (KIQS)
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 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
Society of Chartered Surveyors Ireland (SCSI)
Union Nationale des Economistes de la Construction (UNTEC)

Construction organisations have been working internationally for many years, but for **Property** developers investing in construction works outside their home country is a more recent phenomenon. Research has shown that approaches to measuring the costs of construction can vary by as much as 25–30%. It is clear, therefore, that international standards are required to ensure global consistency in the way the costs of construction projects are expressed.

The aim of the **Coalition** is to provide a structure and format for classifying, defining, analysing and presenting construction costs that will provide consistency and transparency across international boundaries. The SSC has focused only on issues directly related to the costs of construction so that national costs can be benchmarked and the causes of differences in costs can be identified.

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

This standard offers a framework of 13 **Project Categories**, each identifying a different type of construction project, and a template against which costs can be classified, recorded, analysed and reported. The **Project Categories** are consistent with the United Nations International Standard Industrial Classification of All Economic Activities, Revision 4. The hierarchical framework has four levels:

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

The composition of Levels 2 and 3 is the same for all **Project Categories**. Although discretion is allowed in the contents of Level 4, some examples of the contents of Level 4 are given in Appendices A, B and C.

This standard provides definitions, scope, attributes and values, units of measurement and explanatory notes for each **Project Category**. It provides guidance on:

- how the standard is to be used
- the level of detail to be included
- the method of dealing with projects combining different project types and
- the approach to be taken to ensure that like is compared with like, especially taking account of different currencies and time frames.

In respect of buildings, the various cost analysis standards worldwide require the measurement of a gross floor area (either external (gross external floor area; GEFA) or internal (gross internal floor area; GIFA)). This permits the representation of overall costs in terms of currency per GEFA or GIFA. Research undertaken elsewhere has identified that these gross floor areas can vary considerably between countries. Measurement guidelines and definitions also vary considerably between countries. The linking of **ICMS** with **IPMS** provides a valuable tool for overcoming these inconsistencies. **ICMS** requires a cost report to include both GEFA (**IPMS** 1) and GIFA (**IPMS** 2) measured in accordance with the rules set out in **IPMS**. These are summarised in Appendix F.

The SSC prioritised setting measurement standards for buildings and selected categories of civil engineering. The civil engineering categories chosen for this first edition of **ICMS** are those that are most commonly required and cover:

- transport
- energy
- oil and gas and
- the utility sectors.

Further categories will be added in the future.

ICMS has been created through a transparent, detailed and inclusive standard-setting process by the SSC. Members of the SSC brought to bear their expertise and knowledge of practices in their own countries as well as a broader understanding informed by their international experience. In addition, they drew upon the guidance of international correspondents. This resulted in a full analysis and appreciation of the standards and practices in many more countries than those directly represented by SSC members. **ICMS** is not a hybrid of those standards but does introduce some concepts that may be new to some markets.

ICMS is a high level standard. Countries that do not have existing established standards are encouraged to adopt **ICMS**. The SSC did not identify any existing standard that was suitable for international adoption. Therefore, in all developed countries, where existing conventions and standards are established, some adjustment may be required. The **ICMSC** anticipates that **ICMS** will work initially in parallel with local standards and for a dual-reporting basis and interface to be adopted where appropriate. In time it is expected that **ICMS** will become the primary basis for both global and local construction cost reporting.

ICMS Standard Setting Committee

In June 2015 the **ICMSC** selected construction cost management experts from around the world to form its Standard Setting Committee (SSC) and develop global standards for construction cost reporting.

The SSC brings together experts including academics, construction cost managers and consultants, project managers, civil engineers, quantity surveyors and information managers.

The SSC operated in two subgroups. One group dealt with civil engineering projects and the other group focused on buildings.

The SSC acts independently from the **Coalition** and its members.

The SSC members and co-authors of this standard 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)	
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Peter Schwanethal (UK)	
Koji Tanaka (Japan)	
Tang Ki-Cheung (Hong Kong)	

Part 1 Context

1.1 Introduction

The aim of **ICMS** is to provide global consistency in classifying, defining, analysing and reporting construction costs at a project, regional and national level. **ICMS** allows:

- construction costs to be consistently and transparently benchmarked
- the causes of differences in costs between projects to be identified
- properly informed decisions on the design and location of construction projects to be made and
- data to be used with confidence for construction project financing and investment, programme and project decision-making, and related purposes.

This part provides definitions of terms that are commonly used throughout the standard. Definitions specific to particular types of projects are provided in Appendices A, B and C. This part also sets out the aim and use of the standard.

1.2 Definitions

Associated Capital Costs

The costs associated with project realisation, from inception to putting the project into use, and which are not part of the **Capital Construction Costs**.

Capital Construction Costs

Expenditure on labour, materials, plant, equipment, site and head office overheads and profit, plus taxes incurred as a direct result of the construction intervention. It is deemed to be the total price payable for work normally included in contracts to construct a building or civil engineering works, including supplies by the client for the contractor to fix. Construction costs also include all temporary works required to undertake the construction work.

Coalition

The Trustees of ICMS, comprising not-for-profit organisations, each with a public interest mandate.

Combined Category Projects

A project comprising more than one **Project Category**.

Cost Categories

Main subdivision of costs under the **Project Categories**.

Cost Group

Major subdivision of **Cost Categories** defined by function or by common purpose.

Cost Management Professional

A **Service Provider** competent to calculate, interpret, analyse, apportion and report on **Total Project Capital Costs**.

Cost Subgroup

Subdivision which defines a cost-significant part of a given **Cost Group** defined by a given function or common purpose.

ICMS

International Construction Measurement Standards.

ICMSC

International Construction Measurement Standards **Coalition**.

IPMS

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

Price Level Adjustment

Increases or decreases in the **Capital Construction Costs**, due to inflation or deflation respectively, over a defined period of time.

Project Attributes

The principal characteristics of the project related to time, cost, scope of works/design, quality, quantity, procurement, location and other contextual features that might impact its cost (see Schedule 1).

Project Categories

Classification of project types based on the United Nations International Standard Industrial Classification (**ISIC**) structure of economic activities.

Project Complexity

The relative intricacy of the **Project Category** by reference to its form, design or method of construction. **Project Complexity** can relate to architectural/engineering design and/or construction, and/or site production and/or work scope or the site or a combination of all.

Project Values

A standard set of descriptors for each of the **Project Attributes**.

Property

Any real estate asset in the built environment.

Risk Allowances

Risk is an uncertain event or circumstance that, if it occurs, will affect the outcome of a project (commonly in terms of cost, time or fitness for purpose). A **Risk Allowance** is a quantitative allowance set aside, or a plan as a precaution against future needs, to allow for uncertainty of outcome. The allowance is based on the product of the probability of an event or circumstance and the cost of the consequences on the **Total Project Capital Cost**.

Service Provider

Any entity providing construction advice, or a service, to a **User** including, but not limited to, project managers, architects, engineers, surveyors, **Cost Management Professionals**, contractors, facility managers, planners, valuers, **Property** managers, asset managers, agents and brokers.

Taxes and Levies

Mandatory cost levied by national governments, states, municipalities or governmental organisations on the net construction costs and which are directly attributable to the project undertaken, whether paid by the contractor or the **User**.

Third Party

Any entity other than a **User** or **Service Provider** with an involvement in a project including, but not limited to, world bodies, governments, banks, other construction financing bodies, data analysts, software vendors and academia.

Total Project Capital Cost

The total of **Capital Construction Costs** and **Associated Capital Costs**.

United Nations ISIC

The United Nations International Standard Industrial Classification of All Economic Activities (**ISIC**) consisting of a coherent and consistent classification structure of economic activities based on a set of internationally agreed concepts, definitions, principles and classification rules. It provides a comprehensive framework within which economic data can be collected and reported in a format that is designed for purposes of economic analysis, decision-taking and policymaking at a national level.

User

An owner-occupier, developer, investor, purchaser, vendor, landlord or tenant, including a public/state body or agency, charity or other public funder.

1.3 Use of the Standards

ICMS can be used for any purpose agreed between **Users**, **Service Providers** and **Third Parties**.

ICMS can be used to analyse and compare historic, present and future costs of new or refurbishment projects. Typical applications include:

- global investment decisions
- international, national and 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 the purpose of insurance and
- valuation of assets and liabilities.

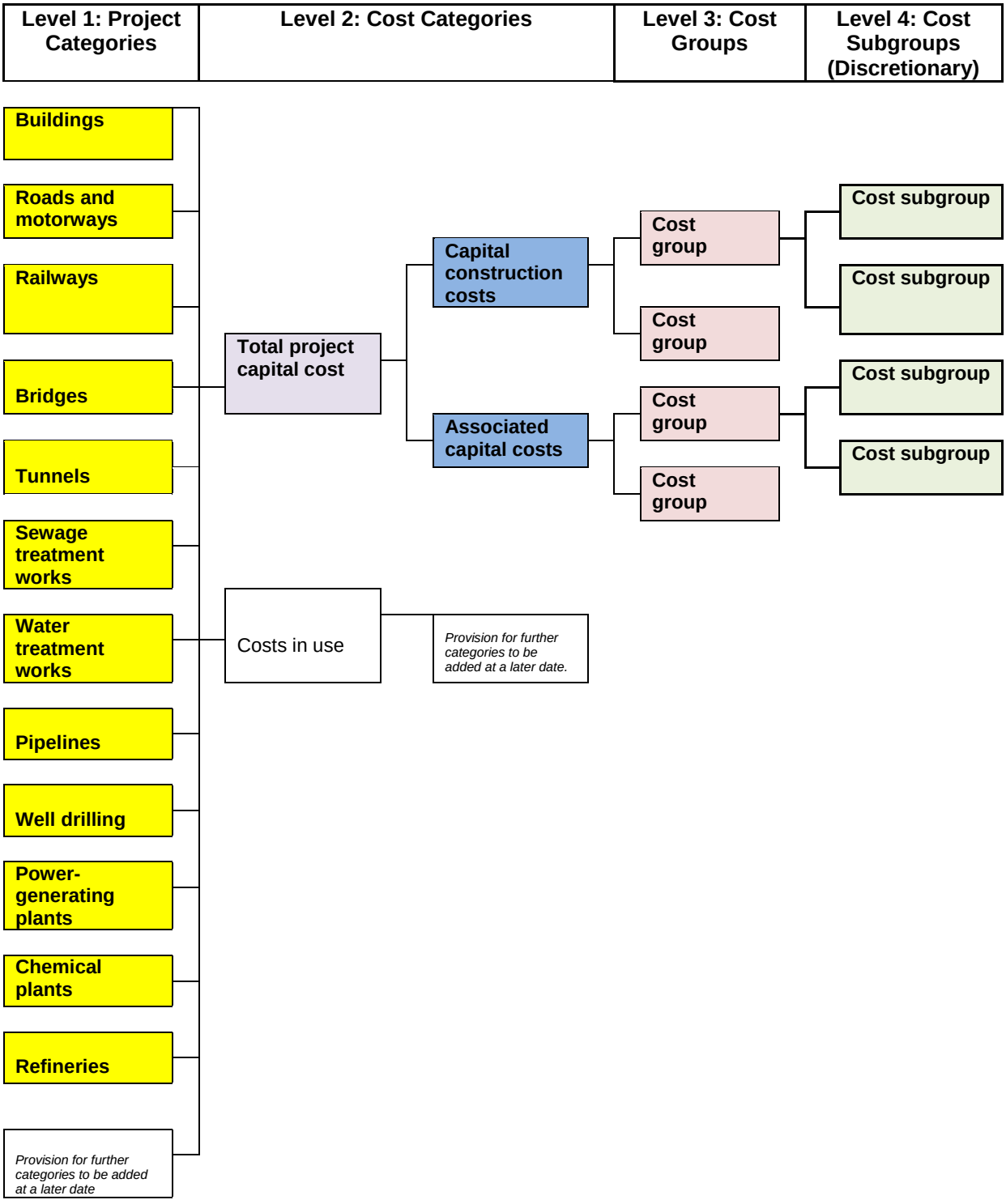
Process flow charts to clarify the use of the standard are provided in Appendix D.

Part 2 ICMS Framework

2.1 Introduction

Conceptually, the overall framework of **ICMS** is as shown in Figure 1.

Figure 1: ICMS Framework



2.2 Hierarchical Levels

The description of each level in Figure 1 is as follows:

Project Categories (Level 1)

ICMS classifies projects by their types into **Project Categories** at Level 1. These categories describe the essence and principal purpose of the project. The **Project Categories** shown in the framework are not exhaustive and will be the subject of further development of the standards in the future.

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 1, are mandatory and standardised for all **Project Categories** to enable high-level comparison between different projects.

Table 1: Definitions of Cost Categories (Level 2) and Cost Groups (Level 3)

	Item	Description
		Cost Categories (Level 2)
		Cost Groups (Level 3)
	0	**Total Project Capital Cost (1 + 2)**
	1	**Capital Construction Costs**
	1.1	Demolition and site preparation • Scope: All necessary advance or facilitating work to prepare and secure the site prior to starting permanent work, but excluding site formation for building projects (which should be included in external works).
	1.2	Substructure • Scope: All the load-bearing works, sometimes referred to as foundations, required to transmit the loads from the structure to the ground. Includes: o piling o caps o footings o lowest floor slabs o basement bottom slabs o basement external walls o road and rail foundations and sub-base o related localised excavation o lateral supports o waterproof tanking o drainage blanket o insulation etc.
	1.3	Structure • Scope: All the load-bearing elements specifically and uniquely required to allow the building or asset to fulfil its function. Includes: o frames o upper floor and roof slabs o staircases o bridge decks and their supports o load-bearing tunnel linings o road pavements and road bases o treatment and process tanks o pools and containers and the like, including their support above the substructure.

	Item	Description
	1.4	Architectural works | non-structural works • Scope for buildings: All architectural and non-load-bearing work. Includes: o non-load-bearing external and internal walls o windows and external doors o internal finishes and fittings o fixed furniture and equipment o prefabricated parts of buildings o works to existing buildings o internal landscaping. • Scope for civil engineering: All non-load-bearing work, whether above or below ground.
	1.5	Services and equipment • Scope: All fixed power-operated services and equipment required to put the completed project into use, whether they are mechanical, hydraulic, plumbing, drainage, fire-fighting, transport, communication, security, electrical or electronic. Includes ancillary building work in connection.
	1.6	Underground drainage • Scope: All surface or underground drainage specifically serving the buildings or assets.
	1.7	External works • Scope: All work outside the external construction face of buildings, excluding civil engineering works forming the major **Project Category**. • Scope for civil engineering: All works beyond the construction that is fulfilling the primary function of the asset.
	1.8	Preliminaries | contractor's site overheads • Scope: Contractor's 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**.
	1.9	**Risk Allowances** • Scope: Allowances for factors which are indeterminate and have not been included in the other **Cost Groups** in this **Cost Category**.
	1.10	**Taxes and Levies**
	2	**Associated Capital Costs**
	2.1	Land or **Property** acquisition • Scope: All payments required to acquire the land or **Property**, excluding physical construction.
	2.2	Construction-related consultants and supervision • Scope: Fees and charges payable to those not engaged by contractors, suppliers or subcontractors.
	2.3	Work and utilities outside site • Scope: All payments to government authorities or public utility companies to connect public work and utilities to the site, or services diversions, to enable the project.
	2.4	Loose furniture, fittings and equipment • Scope: Provided for the building or asset to perform its function close to or after completion.
	2.5	Administrative, finance, legal and marketing expenses • Scope: All other expenses which may be incurred to support or enable the project.
	2.6	**Risk Allowances** • Scope: Allowances for factors which are indeterminate and have not been included in the other **Cost Groups** in this **Cost Category**.

- Accepted alternative terms are separated with a vertical slash (|).
- Costs should be suitably rounded off. State 'not applicable' or 'excluded' where appropriate to avoid doubt.

Cost Subgroups (Level 4)

This standard does not mandate the classification of the **Cost Subgroups**, but gives the following examples in the Appendices:

- Appendix A: Examples of Level 4 **Cost Subgroups**: Buildings
- Appendix B: Examples of Level 4 **Cost Subgroups**: Civil Engineering
- Appendix C: Examples of Level 4 **Cost Subgroups**: **Associated Capital Costs**

The costs of components of a project under each **Cost Group** serving a specific function are grouped into one **Cost Subgroup** such that the cost of alternatives serving the same function can be compared, evaluated and selected. **Cost Subgroups** are chosen irrespective of their design, specification, materials or construction and usually vary in direct proportion to a common quantity factor.

Users may adopt a classification based on trades, work breakdown structure or work results according to their local practice.

2.3 *Project Attributes and Project Values (Schedule 1)*

Project Attributes and **Project Values** are all the principal characteristics of the project that may have a significant effect on its cost, including but not limited to location, cost base date, size, currency, and key project dates. In order to capture these principal characteristics and to enable concise evaluation and comparison between different projects or different design schemes, this standard provides a set of **Project Attributes** and **Project Values** in Schedule 1 for each of the **Project Categories**.

When currency conversion has already been done for reporting using this standard, the exchange rate(s) used should be stated. When using a cost report at a different point in time, or in a different currency, due consideration should be given to the effects of the changes in the price levels and the currency exchange rates using an appropriate method.

Project quantity means the areas, lengths, or functional capacities or outputs required to be captured in the **Project Attributes** and **Project Values** such that the costs of different projects or design schemes can be converted to a unit cost per the desired project quantity for evaluation and comparison. Two units of measurement are required. The first defines the size of the project and the second defines the functional capacity or output of the project. For example, power-generating plants require both the site area (in hectares or acres) and the capacity in megawatts (MW), so that the unit costs may be expressed as both cost/hectare or acre and cost/MW.

2.4 Combined Category Projects

Some projects will span more than one **Project Category**. Wherever possible, costs should be allocated to **Cost Groups** within the relevant **Project Category**. Costs that are spread over more than one **Project Category** should be allocated to the relevant **Cost Group** in the main **Project Category**. In some cases it may be difficult to decide which is the main **Project Category**: in such cases, the main **Project Category** should relate to the primary function of the project.

Schedule 1 Project Attributes and Project Values for Each Project Category

Notes:
1. All values should be given so long as the attributes are relevant.
2. Alternative values are separated with a vertical slash (|).
3. Bullet points indicate additional values.
4. All quantities should be rounded to the nearest whole number unless considered inappropriate on special occasions.
5. These **Project Attributes** and **Project Values** capture the principal cost-significant characteristics of a project.

Project Attributes	Project Values
Common (for all **Project Categories**)	
Report	
Status of cost report	Pre-construction forecast | mixture of actual and forecast during construction | actual costs after construction.
Date of cost report	Month | revision number.
Brief description of the project	Client | function | scope.
Location and country	International Organisation for Standardisation (ISO) country code (e.g. CN) | address of building site(s) | start and end locations for civil engineering works.
Price Level	
Currency	ISO currency code (e.g. USD).
Exchange rates	Rate used to convert from actual cost | payment currencies to the reported currency at the cost base date.
Cost base date	Month | revision number.
Programme	
Project status	Concept and initiation phase | design phase | construction and commissioning phase | complete.
Construction period	Date of start of demolition and site preparation to completion of commissioning in months.
Site	
Existing site status	• Greenfield | brownfield • urban | rural | agricultural.
Site topography	Principally flat | principally hilly | mixed | mountainous.
Ground conditions	Soft | rocky | reclaimed.
Procurement	
Funding	Private | public | public and private in partnership.
Project delivery	Conventional bills of quantities | design bid build | design and build (turnkey) | build operate and transfer | management contracting | construction management | others stated.
Buildings (A construction with a cover and enclosure to house people, equipment or goods for persistent daily use.)	
Code	
UN ISIC code	F4100
Local functional code (if relevant)	• Name of local classification standard • code number.
Works	
Functional type	• Residential | office | commercial | shopping centre | industrial | hotel | car park | warehouse | educational | hospital | airport terminal | railway station | ferry terminal | mixed • new building | refurbishment, renovation, retrofit, revitalisation | restoration.
Grade	Ordinary quality | medium quality | high quality. (The qualitative description must be read in conjunction with the location.)
Environmental grade	Grade of environmental certification.

Project Attributes	Project Values
Principal design features	• Structural (predominant): timber | concrete | steel | load-bearing masonry | others stated • external walls (predominant): stone | brick/block | render/block | curtain walling | others stated • environmental control: non air-conditioned | air conditioning.
Project Complexity	• Morphology (on plan): circular, elliptical or similar | square, rectangular, or similar | complex • design: simple | bespoke | innovative • method of working: sectional completion | out-of-hours working | confined working | others stated.
Design life	Years.
Altitude	Average height of site above or below sea level (m | ft).
Dimensions	Overall length × width × height of each building (m | ft).
Storey above ground (qualitative)	House | low rise | medium rise | high rise. (The qualitative description must be read in conjunction with the location.)
Storey above ground (quantitative)	Specific number | 0–3 | 4–7 | 8–20 | 20–30 | 30–50 | over 50.
Storey below ground	Specific number.
Project Quantities	
Site area	Site area within lot boundary of building site, excluding temporary working areas outside the site (m^2 | ft^2).
Gross external floor area as **IPMS** 1	m^2 | ft^2
Gross internal floor area as **IPMS** 2	m^2 | ft^2
Functional units	Occupancy | 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 | others stated.
Roads and Motorways (A thoroughfare, route, or way for vehicular traffic on land between two places including but not limited to alley, street, collector and rural roads, county and interstate highways. Roads or sections of roads in tunnels shall be included in tunnels. Elevated motorways shall be included in bridges. When a motorway or road is partly in tunnel or partly elevated or over bridges, each such section shall be dealt with as a subproject.)	
Code	
UN ISIC code	F4210
Local functional code (if relevant)	• Name of local classification standard • code number.
Works	
Functional type	• Highway | freeway | expressway | road | lane • smooth surface | speed humps • switchbacks | undulating | flat | mixed • straight | winding | mixed.
Environmental grade	Grade of environmental certification.
Principal design features	• At grade | in cutting | in tunnel | on embankment | elevated | mixed • number of carriageways • number of lanes per carriageway • lane width (m | ft) • hard shoulders | no hard shoulders • footways | no footways • flexible construction | concrete pavement.
Project Complexity	• Number of grade-separated intersections • number of at-grade intersections • number of crossings over roads, railways, waterways and the like • number of access ramps.
Design life	Years.

Project Attributes	Project Values
Altitude	• Minimum height of passageway above or below sea level • maximum height of passageway above or below sea level (m | ft).
Dimensions	Total width of metalled surface of each road or motorway (m | ft) (including hard shoulders but excluding footways).
Project Quantities	
Site area	Area of land covered by permanent works, excluding temporary working areas outside the site (hectares | acres).
Length	km | miles
Functional units	Capacity (vehicles per hour).
Railways (A permanent way, 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 but excluding railways that are predominantly underground. Railways below ground shall be included in tunnels.)	
Code	
UN ISIC code	F4210
Local functional code (if relevant)	• Name of local classification standard • code number.
Works	
Functional type	Passenger | freight | industrial | mixed.
Environmental grade	Grade of environmental certification.
Principal design features	• Design speed • for electric | diesel | others stated | mixed locomotives • number of tracks • track gauge • flexible | rigid construction • fish-plated | welded joints.
Project Complexity	• Number of intersections with roads and other railways • number of crossings over water, roads, other railways, valleys and the like.
Design life	Years.
Altitude	• Minimum height of track bed above or below sea level • 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	
Site area	Area of land covered by permanent works, excluding temporary working areas outside the site (hectares | acres).
Length	km | miles
Functional units	Capacity (passengers per day and freight (tonnes | tons) per day).
Bridges (A structure designed to carry roads, railways, pedestrians or services across a physical obstacle such as a body of water, valley, river, underpass, road or similar.)	
Code	
UN ISIC code	F4210
Local functional code (if relevant)	• Name of local classification standard • code number.
Works	
Functional type	For roads | rail | conveyors | pipeline | mixed | others stated.
Environmental grade	Grade of environmental certification
Principal design features	• Arch | post and beam | cantilever | suspension | cable-stayed | other stated • fixed | movable | temporary • natural materials | wood | concrete | steel | advanced materials | mixed.
Crossing type	• River and canal | roads and motorways | railways | others stated.
Project Complexity	• Straight | curved • number of access ramps.

Project Attributes	Project Values
Design life	Years.
Altitude	Average height of deck above or below sea level (m | ft).
Dimensions	• Width (including walkways, hard shoulders and the like) • maximum height above the lowest point land/water (m | ft) • minimum clearance height (m | ft).
Project Quantities	
Site area	Area of land covered by permanent works, excluding temporary working areas outside the site (hectares | acres).
Length	Deck length (km | miles).
Functional units	Capacity (vehicles per hour, litres | gallons per hour, tonnes | tons per hour).
Tunnels (An artificial underground or underwater passageway that supports vehicular or other traffic, including services for crossing rivers, mountains, conurbations or other terrain, completely enclosed except for openings for entrance and exit, commonly at each end, and for ventilation.)	
Code	
UN ISIC code	F4210
Local functional code (if relevant)	• Name of local classification standard • code number.
Works	
Functional type	Road | railway | pipeline | conveyor | mixed.
Environmental grade	Grade of environmental certification.
Principal design features	• Cut and fill | tunnel-boring machine | drill and blast | in compressed air | not in compressed air | mixed • lined with iron | steel | concrete | not lined • predominantly straight | curved | mixed • underwater | not underwater • ventilated | not ventilated.
Project Complexity	• Number of intersections • predominantly flat | undulating.
Design life	Years.
Altitude	• Minimum height of passageway above or below sea level • maximum height of passageway above or below sea level (m | ft).
Dimensions	Internal clear diameter | width and height of each tunnel (m | ft).
Project Quantities	
Site area	Area of land covered by permanent works, excluding temporary working areas outside the site (hectares | acres).
Length	km | miles.
Functional units	Capacity (vehicles per hour, litres | gallons per hour, tonnes | tons per hour).
Sewage Treatment Works (A facility for the cleaning and improvement of water that contains waste product, contaminant or pollutant to make it safe for discharge to land or water.)	
Code	
UN ISIC code	F4220
Local functional code (if relevant)	• Name of local classification standard • code number.
Works	
Functional type	Description of primary, secondary and tertiary treatment processes.
Environmental grade	Grade of environmental certification.
Principal design features	• Plant | technology | number of modules • tank materials for each process (steel | concrete | others stated) • fixed | temporary.
Project Complexity	Standard of cleanliness of treated water.
Design life	Years.
Altitude	Average height of site above or below sea level (m | ft).

Project Attributes	Project Values
Dimensions	Overall external diameter | length × width × height of each major structure (m | ft).
Project Quantities	
Site area	Area of land covered by permanent works, excluding temporary working areas outside the site (hectares | acres).
Functional units	Capacity (litres | gallons per day).
Water Treatment Works (A facility for the cleaning and improvement of water to make it potable.)	
Code	
UN ISIC code	F4220
Local functional code (if relevant)	• Name of local classification standard • code number.
Works	
Functional type	Processes involved (screening, pre-ozonation, coagulation and | or flocculation, clarification, filtration, pH correction, chemical dosing, chlorination, others).
Environmental grade	Grade of environmental certification.
Principal design features	• Plant technology • number of modules • tank materials for each process (steel | concrete | others stated) • fixed | temporary.
Project Complexity	Number of processes | level of cleanliness of treated water.
Design life	Years.
Altitude	Average height of site above or below sea level (m | ft).
Dimensions	Overall external diameter | length × width × height of each major structure (m | ft).
Project Quantities	
Site area	Area of land covered by permanent works, excluding temporary working areas outside the site (hectares | acres).
Functional units	Capacity (litres | gallons per day).
Pipelines (A series of pipes and tubing for the transfer of liquid or gas not exceeding 2,400mm (8ft) in diameter. Pipelines of larger diameter are classed as tunnels.)	
Code	
UN ISIC code	F4220
Local functional code (if relevant)	• Name of local classification standard • code number.
Works	
Functional type	For transporting liquid | gas | cables.
Environmental grade	Grade of environmental certification.
Principal design features	• Principal materials • minimum and maximum depths below ground • minimum and maximum heights above ground • cut and cover | directional drilling • insulation type | no insulation • corrosion protection measures.
Project Complexity	• On land | underwater • number of intersections • number of specials • number of crossings over roads, railways, waterways and the like.
Design life	Years.
Altitude	• Minimum height above or below sea level • maximum height above or below sea level (m | ft).
Dimensions	Number and diameter of each pipe (m | ft).
Project Quantities	
Site area	Area of land covered by permanent works, excluding temporary working areas outside the site (hectares | acres).

Project Attributes	Project Values
Length of pipes	Sum of number × each length (km | miles).
Length from servicing inlets to outlets	(km | miles)
Functional units	Capacity (litres | gallons | m^3 | ft^3 per hour) | cable capacity (MW).
Well Drilling (Process of drilling in the ground for the purpose of extraction of a natural resource or the injection of a fluid or for the evaluation/monitoring of subsurface formations.)	
Code	
UN ISIC code	F4220
Local functional code (if relevant)	• Name of local classification standard • code number.
Works	
Functional type	• Water | gas | oil | others stated • on land | in water.
Environmental grade	Grade of environmental certification.
Principal design features	Lining material: steel | concrete | others stated.
Project Complexity	Vertical | directional.
Design life	Years.
Altitude	Commencing height above | below sea level (m | ft).
Dimensions	Number and diameter of each drill hole (m | ft).
Project Quantities	
Site area	Area of land covered by permanent works, excluding temporary working areas outside the site (hectares | acres).
Length of drilled depth	m | ft
Functional units	Capacity (m^3 | ft^3 | litres | gallons per hour).
Power-Generating Plants (A facility for the generation of electrical power through the process of, but not limited to, nuclear fission, wind power, solar power, hydroelectric, geothermal, biomass, gas, coal, or oil.)	
Code	
UN ISIC code	F4290
Local functional code (if relevant)	• Name of local classification standard • code number.
Works	
Functional type	Nuclear | wind-power | solar power | hydroelectric | geothermal | biomass | gas | coal | oil | others stated.
Environmental grade	Grade of environmental certification.
Principal design features	• Generator containment material (concrete | steel | mixed | others stated) • coolant (water | gas | others stated) • heat exchanger | direct cycle • number and size of turbines (MW).
Project Complexity	Cooling system (wind | water | mixed).
Design life	Years
Altitude	Average height of site above or below sea level (m | ft).
Dimensions	Overall external diameter | length × width × height of each major structure (m | ft).
Project Quantities	
Site area	Area of land covered by permanent works, excluding temporary working areas outside the site (hectares | acres).
Functional units	Capacity (MW)
Chemical Plants (A facility for the creation of chemical products excluding petro-chemicals.)	
Code	
UN ISIC code	F4290
Local functional code (if relevant)	• Name of local classification standard • code number.
Works	
Functional type	Product description.
Environmental grade	Grade of environmental certification.

Project Attributes	Project Values
Principal design features	• Principal processes • description of principal reactor materials (mild steel | stainless steel | concrete | others stated | mixed).
Project Complexity	Number of processes.
Design life	Years.
Altitude	Average height of site above or below sea level (m | ft).
Dimensions	Overall external diameter | length × width × height of each major structure (m | ft).
Project Quantities	
Site area	Area of land covered by permanent works, excluding temporary working areas outside the site (hectares | acres).
Functional units	Output of product per day (m^3 | ft^3 | tonnes | tons | litres | gallons per day).
Refineries (A facility for the creation of petro-chemical products.)	
Code	
UN ISIC code	F4290
Local functional code (if relevant)	• Name of local classification standard • code number.
Works	
Functional type	Oil | petrol | others stated | mixed.
Environmental grade	Grade of environmental certification.
Principal design features	• Description of principal processes • description of principal reactor materials (mild steel | stainless steel | concrete | others stated | mixed).
Project Complexity	• Number of processes • number of products.
Design life	Years.
Altitude	Average height of site above or below sea level (m | ft).
Dimensions	Overall external diameter | width and height of each major structure (m | ft).
Project Quantities	
Site area	Area of land covered by permanent works, excluding temporary working areas outside the site (hectares | acres).
Functional units	Output of product per day in tonnes | tons | litres | gallons | barrels.

Schedule 2 Substructure and Structure Delineation for Each Project Category

Buildings

Substructure:

Foundations, including:

- piling, up to and including lowest floor slabs
- basement sides and related excavation
- lateral supports
- waterproof tanking
- drainage blanket and
- insulation.

Structure:

- Structural frames
- Upper floors
- Stairs and roof slabs including the basement suspended floors and fireproofing to steel structure
- Prefabricated buildings
- External and internal walls
- Works to existing buildings structure.

Roads and Motorways

Substructure:

- Structural backfill | lean concrete | ground remediation
- Earth-retaining structures and embankments
- Piling
- Foundations and sub-base supporting the pavement.

Structure:

- Pavement structure, including road base
- Pavement surface
- Edge treatment.

Railways

Substructure:

Work below track bed including:

- structural backfill | lean concrete | ground remediation
- earth-retaining structures and embankments
- piling and
- foundations and sub-base supporting the track structure.

Structure:

- Paved track beds
- Ballast
- Sleepers

- Running rails.

Bridges (Including Viaducts, Elevated Roads, Motorways, Railways and the like)

Substructure:

- Excavation
- Foundations
- Piling
- Abutments
- Wing walls
- Thrust blocks
- Anchorages supporting the structure.

Structure:

- Deck structure
- Deck support
- Piers
- Towers and the like
- Beams
- Girders, trusses and the like
- Ribs
- Cables
- Hangers and the like
- Bearings
- Edge treatment
- Approach transition construction.

Tunnels

Substructure:

- Excavation and drilling for tunnelling
- Shafts
- Galleries and the like
- Foundations supporting the tunnel.

Structure:

- Lining to tunnel
- Shafts, galleries and the like
- Portals.

Sewage Treatment Works and Water Treatment Works

Containing structure, tanks and the like

Substructure:

- Excavation
- Foundations
- Piling
- Bases supporting the structure above or below ground level.

Structure:

- Tank
- Structure
- Supports above foundations inflow | outflow.

Pipelines

See the Pipelines **Project Category**.

Pipelines

Substructure:

- Excavation
- Beds and surrounds to underground pipelines and embankments
- Bases for structures supporting pipes above ground.

Structure:

- Pipes

Wells

Substructure:

- Excavation
- Foundations piling and the like to support well head
- Excavation
- Drilling for shafts.

Structure:

- Well head
- Lining to well.

Power-Generation Plants, Chemical Plants and Refineries

- Buildings
- Structures and systems in plants and refineries to follow the principles set out in the other **Cost Categories** above.

Appendices

Appendix A: Examples of Cost Subgroups: Buildings

Item	Description	Note
	Cost Category (Level 2)	
	Cost Group (Level 3) Cost Subgroup (Level 4)	
1	**Capital Construction Costs**	
1.1	Demolition and site preparation	
	Site survey and investigation	
	Environmental treatment	
	Sampling for construction, geophysical, geological or similar purposes	
	Temporary fencing	
	Demolition of existing buildings and support to adjacent structures	
	Site surface clearance (clearing, grubbing, topsoil stripping, tree felling, minor earthwork, removal)	
	Tree transplant	
	Temporary surface drainage	
	Temporary protection, diversion and relocation of public utilities	
1.2	Substructure	
	Foundation piling: - mobilisation and demobilisation - trial piles - permanent piles - pile testing.	
	Foundations up to top of lowest floor slabs: - excavation and disposal - lateral supports - raft footings, pile caps, column bases, wall footings, strap beams, tie beams - substructure walls and columns - ground beams and ground slabs - lift pits.	
	Basement sides and bottom: - excavation and disposal - lateral supports - bottom slabs and blinding - sides - vertical waterproof tanking, drainage blanket, drains and skin wall - horizontal waterproof tanking, drainage blanket, drains and topping slab - insulation - lift pits, sump pits, sleeves.	
1.3	Structure	
	Structural removal and alterations	
	Basement suspended floors: - walls and columns - beams and slabs - staircases.	
	Frames and slabs: - walls and columns - upper floor beams and slabs - roof beams and slabs - staircases - fireproofing to steel structure.	
	Tanks, pools, sundries	
1.4	Architectural works | Non-structural works	
	Non-structural removal and alterations	
	External elevations: - non-structural external walls and features	

Item	Description	Note
	- external wall finishes - metal cladding and curtain walls. - External windows - External doors - External shop fronts - Roller shutters and fire shutters.	
	Roof finishes, skylights and landscaping (including waterproofing and insulation): - roof finishes - skylights - roof landscaping (hard and soft).	
	Internal divisions: - non-structural internal walls and partitions - shop fronts - toilet cubicles - cold rooms - internal doors - internal windows - roller shutters and fire shutters - sundry concrete work.	
	Fittings and sundries: - balustrades, railings and handrails - staircases and catwalk not forming part of the structure, cat ladders - cabinets, cupboards, shelves, counters, benches, notice boards, blackboards - exit signs, directory signs - pelmets and curtains - decorative features - interior landscaping - access panels, fire service cabinets - sundries.	
	Finishes under cover: - floor finishes (internal and external) - internal wall finishes and cladding - ceiling finishes and false ceilings (internal or external).	
	Builder's work in connection with services: - plinth, bases - fire-proofing enclosure - hoisting beams, lift pit separation screens - suspended manholes - cable trenches, trench covers - sleeves, openings and the like not allowed for in Fittings and sundries.	
1.5	Services and equipment	
	Heating, ventilating and air-conditioning systems/air conditioners: - seawater system - cooling water system - chilled water system - heating water system - steam and condensate system - fuel oil system - water treatment - air handling and distribution system - condensate drain system - unitary air-conditioning system - mechanical ventilation system - kitchen ventilation system - fume-extraction system - anaesthetic gas-extraction system - window and split-type air conditioners - air-curtains - fans - related electrical and control systems.	
	Electrical services:	

Item	Description	Note
	- high-voltage transformers and switchboards - incoming mains, low-voltage transformers and switchboards - main and submain - standby system - lighting and power - uninterrupted power supply - electric underfloor heating - local electrical heating units - earthing/lightning protection and bonding.	
	Fitting out lighting fittings	
	Extra low voltage electrical services: - communications - staff paging/location - public address system - building automation - security and alarm - close circuit television - communal aerial broadcast distribution and the like	
	Water supply and above-ground drainage: - cold water supply - hot water supply - flushing water supply - grey water supply - cleansing water supply - irrigation water supply - rainwater disposal - soil and waste disposal - planter drainage disposal - kitchen drainage disposal - related electrical and control systems.	
	Supply of sanitary fittings	
	Disposal systems: - refuse - laboratory waste - industrial waste - incinerator.	
	Fire services: - fire hydrant and hose reel system - wet risers - sprinkler system - deluge system - fire hydra - gaseous extinguishing system - foam extinguishing system - audio/visual advisory system - automatic fire alarm and detection system - portable hand-operated appliances - related electrical and control systems.	
	Gas services: - coal gas - natural gas - liquid petroleum gas - medical gas/laboratory gas - industrial gas/compressed air/instrument air - vacuum - steam.	
	Movement systems: - lifts - escalators - conveyors.	
	Gondolas	

Item	Description	Note
	Turntables	
	Generators and uninterruptible power supply	
	Energy-saving features	
	Sewage treatment	
	Fountains, pools and filtration plant	
	Powered building signage	
	Kitchen equipment	
	Cold room equipment	
	Laboratory equipment	
	Medical equipment	
	Hotel equipment	
	Car park or entrances access control	
	Domestic appliances	
	Other specialist services	
	Builder's profit and attendance on services	
1.6	Underground drainage	
	Storm water and surface water drainage	
	Soil and waste drainage	
	Drainage connections	
	CCTV inspection of drains	
1.7	External works	
	Site formation and incidental temporary drainage further to site preparation	
	Permanent retaining structures	
	Site enclosures and divisions	
	Ancillary structures	
	Roads and paving	
	Landscaping (hard and soft)	
	Fittings and equipment	
	External services: - water supply - gas supply - power supply - communications supply - external lighting - utility connections.	
1.8	Preliminaries | Contractor's site overheads	(a)
	Construction management including site management staff and support labour	
	Insurances and bonds	
	Common construction plant	
	Temporary facilities and services	
	Contractor's submissions and reports	
	Building information modelling (BIM)	
	Traffic management and diversion	
	Safety, health and environmental management	
	Monitoring and recording	
	Testing and commissioning	
	As-built documentation	
1.9	**Risk Allowances**	(a), (b)
	Design development allowance	(c)
	Construction contingencies	(d)
	Price Level Adjustment: - before tender - during construction.	(e)
	Exchange rate fluctuation adjustments	
1.10	**Taxes and Levies**	(a)
	Paid by the contractor	
	Paid by the client in relation to the construction contract payments	

- As Level 4 details are discretionary, no item numbering has been assigned.
- Accepted alternative terms are separated with a vertical slash (|).

- Costs should be suitably rounded off. State ‘not applicable’ or ‘excluded’ where appropriate to avoid doubt.

Explanatory notes

(a) Items 1.8–1.10 to be apportioned into item 1.1–1.7 in case of simplified presentation.

(b) **Risk Allowances** are as defined. As the project develops, the allowances 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 contractor's contract sum build-up or reserved in the client's own budget not known to the contractor. For cost reports on actual costs after construction, any surplus allowances are not to be included.

(c) Design development allowance 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.

(d) Construction contingencies are 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.

(e) **Price Level Adjustment** allowances are as defined. 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 inflationary increase during construction. Allowances would therefore be required to cover the possible increase until the time of tendering, and further increase 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 may therefore be included in the contract for the possible increase, and will gradually be replaced with the actual expenditure.

Appendix B: Examples of Cost Subgroups: Civil Engineering Works

Item	Description	Roads and Motorways	Railways	Bridges	Tunnels	Sewage Treatment Works	Water Treatment Works	Pipelines	Well Drilling	Power Generating Plants	Chemical Plants	Refineries	Note
	Cost Category (Level 2)												
	Cost Group (Level 3) Cost Subgroup (Level 4)												
1	**Construction Costs**												
1.1	Demolition and site preparation												
	Site survey and soil investigation	◙	◙	◙	◙	◙	◙	◙	◙	◙	◙	◙	
	Demolition of existing structures and support to adjacent structures	◙	◙	◙	◙	◙	◙	◙	◙	◙	◙	◙	
	Site surface clearance	◙	◙	◙	◙	◙	◙	◙	◙	◙	◙	◙	
	Earth moving/earthwork	◙	◙	◙	◙	◙	◙	◙	◙	◙	◙	◙	
	Temporary drainage	◙	◙	◙	◙	◙	◙	◙	◙	◙	◙	◙	
	Protection, diversion and relocation of public utilities	◙	◙	◙	◙	◙	◙	◙	◙	◙	◙	◙	
1.2	Substructure												
	Structural backfill/lean concrete/ground remediation	◙	◙	◙	◙	◙	◙	◙	◙	◙	◙	◙	
	Earth-retaining structures	◙	◙	◙	◙								
	Embankments/cuttings	◙	◙	◙	◙								
	Drilling/boring				◙			◙	◙				
	Lining				◙								
	Piling/anchoring	◙	◙	◙		◙	◙			◙	◙	◙	
	Foundations	◙	◙	◙	◙	◙	◙	◙	◙	◙	◙	◙	
	Sub-base below the structural base	◙	◙										
	Bases below the structure	◙	◙	◙	◙	◙	◙	◙	◙	◙	◙	◙	
	Trenching	◙	◙	◙	◙	◙	◙	◙	◙	◙	◙	◙	
	Abutments/wing walls	◙	◙	◙									
	Bearings	◙	◙	◙									
1.3	Structure												
	Pavement	◙	◙	◙	◙								
	Road/track base	◙	◙										
	Parapets/edge treatment				◙								
	Service roads and approaches	◙	◙	◙	◙	◙	◙	◙	◙	◙	◙	◙	
	Decks	◙	◙	◙	◙								
	Piers and towers			◙									

Item	Description	Roads and Motorways	Railways	Bridges	Tunnels	Sewage Treatment Works	Water Treatment Works	Pipelines	Well Drilling	Power Generating Plants	Chemical Plants	Refineries	Note
	Suspension system			◙									
	Structural members	◙	◙	◙	◙	◙	◙	◙		◙	◙	◙	
	Facility structure					◙	◙			◙	◙	◙	
	Tanks, rigs, storage containers and the like					◙	◙	◙	◙	◙	◙	◙	
	Supports for tanks, pipes and the like above substructure					◙	◙	◙	◙	◙	◙	◙	
	Minor buildings	◙	◙	◙	◙	◙	◙	◙	◙	◙	◙	◙	
	Civil pipework					◙	◙	◙	◙		◙	◙	
1.4	Non-structural works												
	Non-structural alterations and reinstatement	◙	◙	◙	◙	◙	◙	◙	◙	◙	◙	◙	
	Non-structural works to facility structure					◙	◙			◙	◙	◙	
	Running surface	◙	◙	◙	◙								
	Category accessories: signage, markings and the like	◙	◙	◙	◙								
	Category accessories: gantries and the like	◙	◙	◙	◙								
	Category accessories: illuminations	◙	◙	◙	◙								
	Pipe racks/supports	◙	◙	◙	◙	◙	◙	◙	◙	◙	◙	◙	
	Cables/cable trays	◙	◙	◙	◙	◙	◙	◙	◙	◙	◙	◙	
	Safety facilities	◙	◙	◙	◙	◙	◙	◙	◙	◙	◙	◙	
	Above ground drainage	◙	◙	◙	◙	◙	◙			◙	◙	◙	
	Barriers/rails and means of access	◙	◙	◙	◙	◙	◙	◙	◙	◙	◙	◙	
	Special equipment and fittings	◙	◙	◙	◙	◙	◙	◙	◙	◙	◙	◙	
	Landscaping	◙	◙	◙	◙	◙	◙	◙	◙	◙	◙	◙	
	Builder's work in connection with services	◙	◙	◙	◙	◙	◙	◙	◙	◙	◙	◙	
	Enclosures/security and the like	◙	◙	◙	◙	◙	◙	◙	◙	◙	◙	◙	
1.5	Services and equipment												
	Mechanical systems	◙	◙	◙	◙	◙	◙	◙	◙	◙	◙	◙	
	Lighting systems	◙	◙	◙	◙	◙	◙	◙	◙	◙	◙	◙	
	Low-voltage power supply	◙	◙	◙	◙	◙	◙	◙	◙	◙	◙	◙	
	High-voltage power supply	◙	◙	◙	◙	◙	◙	◙	◙	◙	◙	◙	
	Other electrical services	◙	◙	◙	◙	◙	◙	◙	◙	◙	◙	◙	
	Control systems and instrumentation	◙	◙	◙	◙	◙	◙	◙	◙	◙	◙	◙	
	Fire services	◙	◙	◙	◙	◙	◙			◙	◙	◙	

Item	Description	Roads and Motorways	Railways	Bridges	Tunnels	Sewage Treatment Works	Water Treatment Works	Pipelines	Well Drilling	Power Generating Plants	Chemical Plants	Refineries	Note
	Movement systems: lifts/elevators/conveyors	◙	◙	◙	◙	◙	◙			◙	◙	◙	
1.6	Underground drainage												
	Civil piping: surface water	◙	◙	◙	◙	◙	◙	◙	◙	◙	◙	◙	
	Civil piping: foul	◙	◙	◙	◙	◙	◙	◙	◙	◙	◙	◙	
	Manholes	◙	◙	◙	◙	◙	◙	◙	◙	◙	◙	◙	
	Pumping systems	◙	◙	◙	◙	◙	◙	◙	◙	◙	◙	◙	
	Connections	◙	◙	◙	◙	◙	◙	◙	◙	◙	◙	◙	
1.7	External works												
	Landscaping	◙	◙	◙	◙	◙	◙	◙	◙	◙	◙	◙	
1.8	Preliminaries | Construction overheads												(a)
	Construction management including site management staff and support labour	◙	◙	◙	◙	◙	◙	◙	◙	◙	◙	◙	
	Insurances and bonds	◙	◙	◙	◙	◙	◙	◙	◙	◙	◙	◙	
	Common construction plant	◙	◙	◙	◙	◙	◙	◙	◙	◙	◙	◙	
	Temporary facilities and services	◙	◙	◙	◙	◙	◙	◙	◙	◙	◙	◙	
	Contractor's submissions and reports	◙	◙	◙	◙	◙	◙	◙	◙	◙	◙	◙	
	Building information modelling (BIM)	◙	◙	◙	◙	◙	◙	◙	◙	◙	◙	◙	
	Traffic management and diversion	◙	◙	◙	◙	◙	◙	◙	◙	◙	◙	◙	
	Safety, health and environmental management	◙	◙	◙	◙	◙	◙	◙	◙	◙	◙	◙	
	Monitoring and recording	◙	◙	◙	◙	◙	◙	◙	◙	◙	◙	◙	
	Testing and commissioning	◙	◙	◙	◙	◙	◙	◙	◙	◙	◙	◙	
	As-built documentation	◙	◙	◙	◙	◙	◙	◙	◙	◙	◙	◙	
1.9	**Risk Allowances**												(a), (b)
	Design development allowance	◙	◙	◙	◙	◙	◙	◙	◙	◙	◙	◙	(c)
	Construction contingencies	◙	◙	◙	◙	◙	◙	◙	◙	◙	◙	◙	(d)
	Price Level Adjustment												(e)
	- Before tender	◙	◙	◙	◙	◙	◙	◙	◙	◙	◙	◙	
	- During construction	◙	◙	◙	◙	◙	◙	◙	◙	◙	◙	◙	
	Exchange rate fluctuation adjustments	◙	◙	◙	◙	◙	◙	◙	◙	◙	◙	◙	
1.10	**Taxes and Levies**												(a)
	Paid by the contractor	◙	◙	◙	◙	◙	◙	◙	◙	◙	◙	◙	
	Paid by the client in relation to the construction contract	◙	◙	◙	◙	◙	◙	◙	◙	◙	◙	◙	

Item	Description	Roads and Motorways	Railways	Bridges	Tunnels	Sewage Treatment Works	Water Treatment Works	Pipelines	Well Drilling	Power Generating Plants	Chemical Plants	Refineries	Note
	payments												

- As Level 4 details are discretionary, no item numbering has been assigned.
- Accepted alternative terms are separated with a vertical slash (|).
- Costs should be suitably rounded off. State 'not applicable' or 'excluded' where appropriate to avoid doubt.

Explanatory notes

(a) Items 1.8–1.10 to be apportioned into item 1.1–1.7 in case of simplified presentation.

(b) **Risk Allowances** are as defined. As the project develops, the allowances 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 contractor's contract sum build-up or reserved in the client's own budget not known to the contractor. For cost reports on actual costs after construction, any surplus allowances are not to be included.

(c) Design development allowance 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.

(d) Construction contingencies are 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.

(e) **Price Level Adjustment** allowances are as defined. Typically, a pre-construction cost estimate may be prepared based on the price level at a certain date that may be current at the time of preparing the estimate or at an earlier base date, with or without allowance for the possible inflationary increase during construction. Allowances would therefore be required to cover the possible increase until the time of tendering, and further increase 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 may therefore be included in the contract for the possible increase, and will gradually be replaced with the actual expenditure.

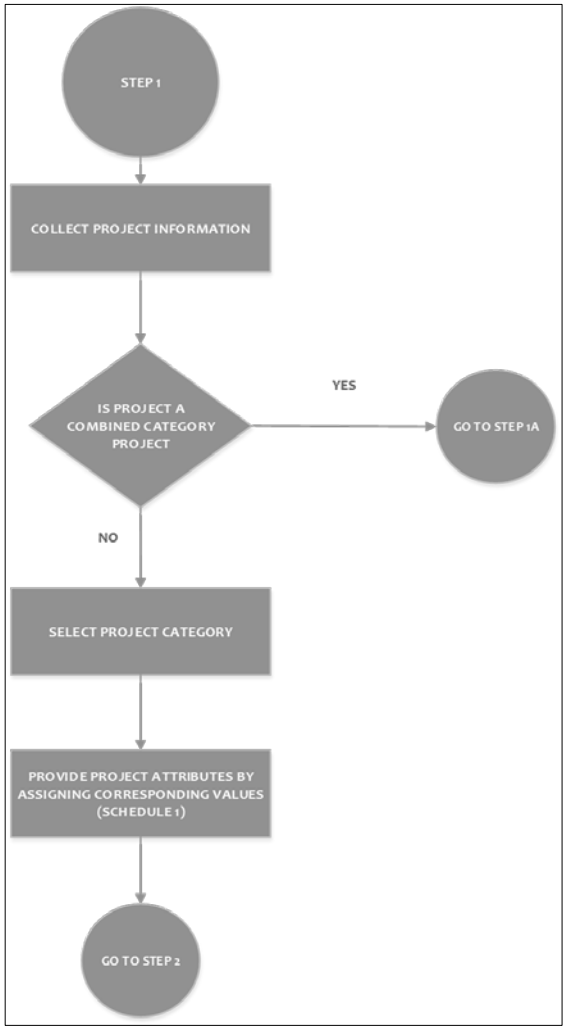
Appendix C: Examples of Cost Subgroups: Associated Capital Costs

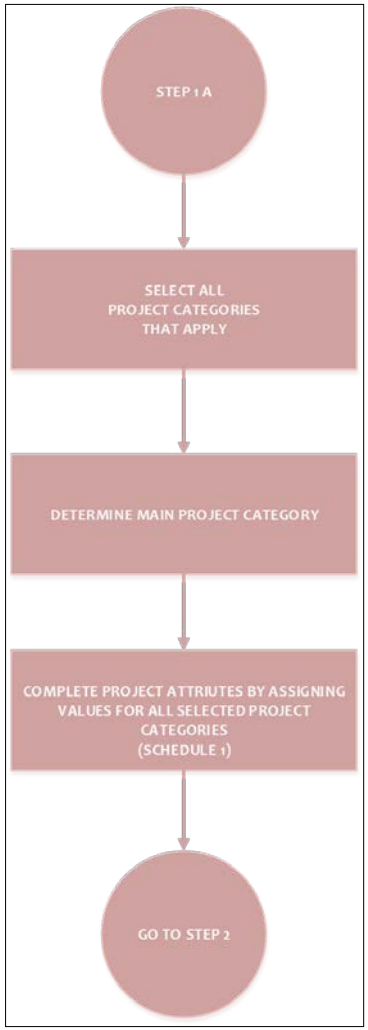
Item	Description
	Cost Category (Level 2)
	Cost Group (Level 3) Cost Subgroup (Level 4)
2	**Associated Capital Costs**
2.1	Land or property acquisition
	Costs and premium required to procure land or existing properties including additional cost and premium to be paid by foreign investors
	Compensation to existing occupiers
	Demolition, removal and modification of existing properties by way of payment to existing owners instead of carrying out physical work
	Related fees to agents, lawyers, and the like
	Related taxes and statutory charges
2.2	Construction-related consultants and supervision
	Consultants' fees and reimbursable: - architects (architectural, landscape, interior design) - engineers (geotechnical, civil, structural, mechanical, electrical and plumbing) - project managers - surveyors (quantity surveying, land surveying, building surveying, cost engineering) - specialist consultants (environmental, traffic, acoustic, facade, BIM) - value management studies.
	Charges and levies payable to statutory bodies or their appointed agencies (in connection with planning, design, tender and contract approvals, supervision and acceptance inspections)
	Site supervision charges (including their accommodation and travels)
	Payments to testing authorities or laboratories
2.3	Work and utilities outside site
	Connections to, diversion of and capacity enhancement of public utility mains or sources outside site up to mains connections on site: - electricity - transformers - water - sewer - gas - telecommunications.
	Public access roads and footpaths
2.4	Loose furniture, fittings and equipment
	Production, process and loose furniture, furnishing and equipment not normally provided before completion of construction.
2.5	Administrative, finance, legal and marketing expenses
	Client’s general office overheads
	Client's project-specific administrative expenses: - in-house project management team - supporting project staff - project office venue, furniture and equipment if not included in contractor’s preliminaries | site overheads - stores and workshops - safety and insurances - staff training - accommodation and travelling expenses for in-house team and external parties.
	Interest and finance costs
	Legal expenses
	Accounting expenses
	Sales, leasing, marketing, advertising and promotional expenses
	Taxes and statutory charges related to sales and lease
	Licence and permit charges for operation and use
2.6	**Risk Allowances**

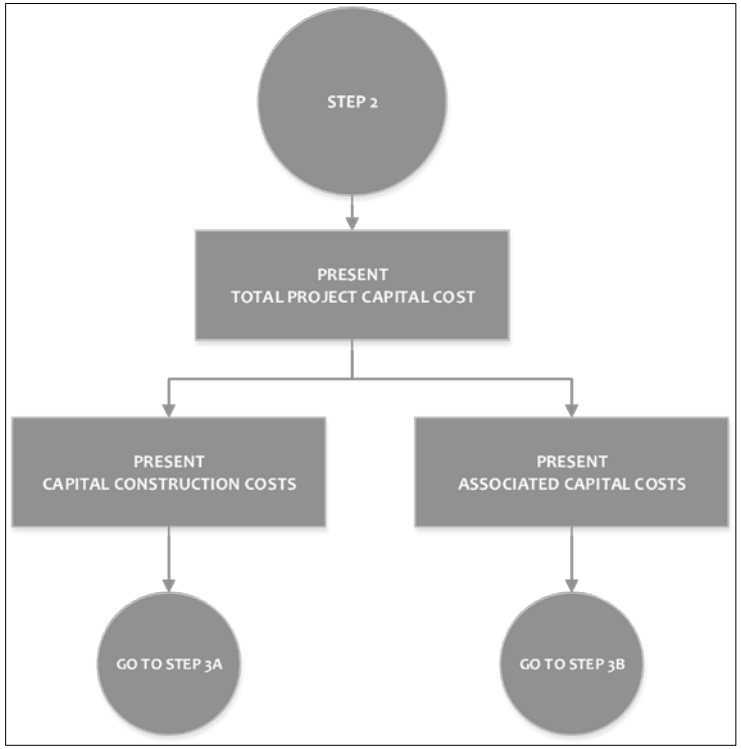
- As Level 4 details are discretionary, no item numbering has been assigned.
- Accepted alternative terms are separated with a vertical slash (|).

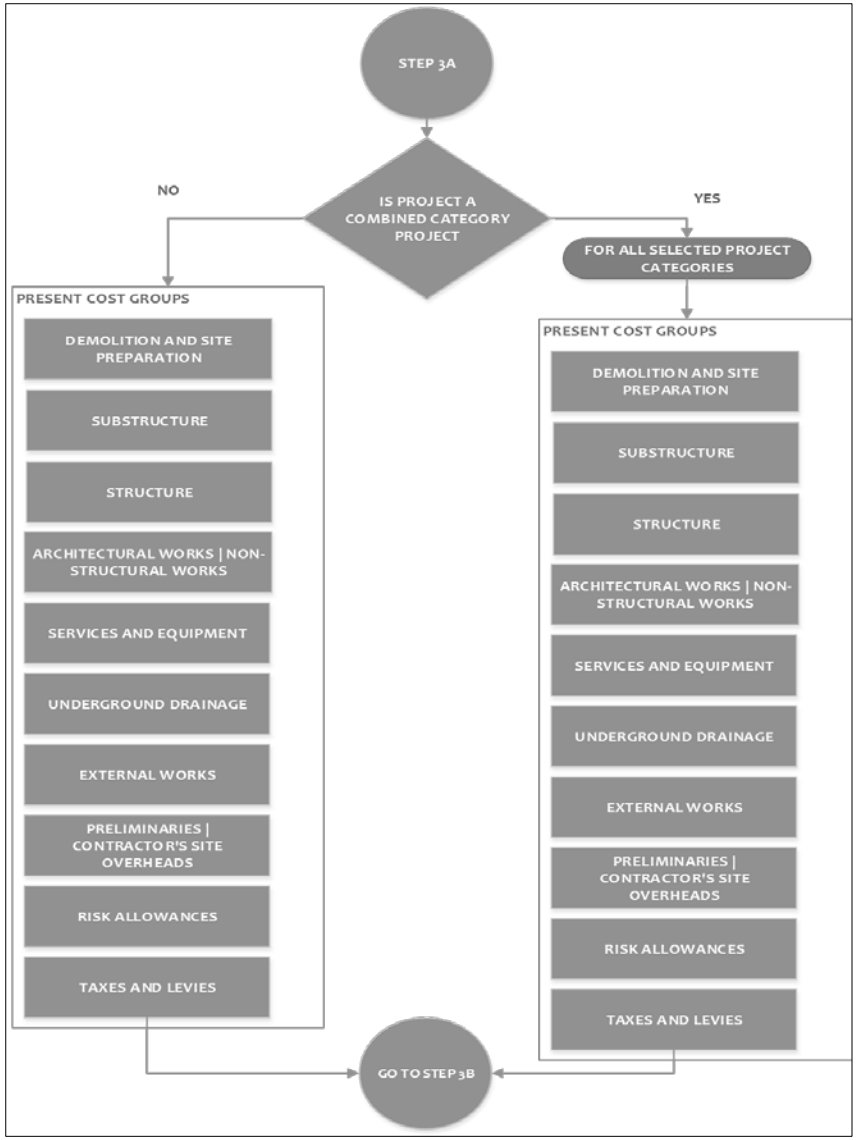
- Costs should be suitably rounded off. State ‘not applicable’ or ‘excluded’ where appropriate to avoid doubt.

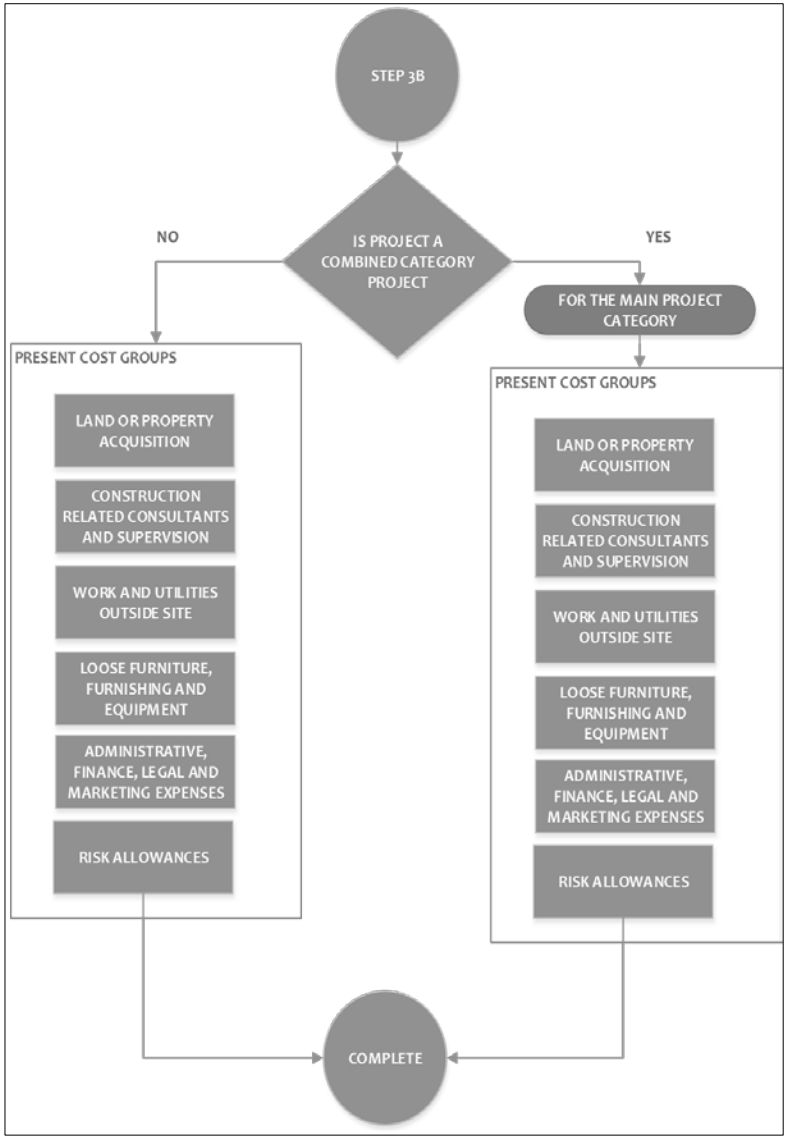
Appendix D: Process Flow Charts








STEP 3A
IS PROJECT A COMBINED CATEGORY PROJECT
NO
YES
FOR ALL SELECTED PROJECT CATEGORIES
PRESENT COST GROUPS
DEMOLITION AND SITE PREPARATION
SUBSTRUCTURE
STRUCTURE
ARCHITECTURAL WORKS | NON-STRUCTURAL WORKS
SERVICES AND EQUIPMENT
UNDERGROUND DRAINAGE
EXTERNAL WORKS
PRELIMINARIES | CONTRACTOR'S SITE OVERHEADS
RISK ALLOWANCES
TAXES AND LEVIES
PRESENT COST GROUPS
DEMOLITION AND SITE PREPARATION
SUBSTRUCTURE
STRUCTURE
ARCHITECTURAL WORKS | NON-STRUCTURAL WORKS
SERVICES AND EQUIPMENT
UNDERGROUND DRAINAGE
EXTERNAL WORKS
PRELIMINARIES | CONTRACTOR'S SITE OVERHEADS
RISK ALLOWANCES
TAXES AND LEVIES
GO TO STEP 3B


STEP 3B
IS PROJECT A COMBINED CATEGORY PROJECT
NO
YES
FOR THE MAIN PROJECT CATEGORY
PRESENT COST GROUPS
LAND OR PROPERTY ACQUISITION
CONSTRUCTION RELATED CONSULTANTS AND SUPERVISION
WORK AND UTILITIES OUTSIDE SITE
LOOSE FURNITURE, FURNISHING AND EQUIPMENT
ADMINISTRATIVE, FINANCE, LEGAL AND MARKETING EXPENSES
RISK ALLOWANCES
PRESENT COST GROUPS
LAND OR PROPERTY ACQUISITION
CONSTRUCTION RELATED CONSULTANTS AND SUPERVISION
WORK AND UTILITIES OUTSIDE SITE
LOOSE FURNITURE, FURNISHING AND EQUIPMENT
ADMINISTRATIVE, FINANCE, LEGAL AND MARKETING EXPENSES
RISK ALLOWANCES
COMPLETE

Appendix E: Reporting Templates

Building Project

Notes:

- Additional columns for unit cost per other project quantity can be added.
- Figures are suitably rounded.
- **Project Attributes** and **Project Values** are not shown in this example, but would normally be provided.

Item	Description	Buildings			
		$M	$/m² (IPMS 1)	$/m² (IPMS 2)	% of '0'
	IPMS 1 Floor Area				
	IPMS 2 Floor Area				
0	**Total Project Capital Cost ('1' + '2')**				
1	**Construction Costs**				
1.1	Demolition and site preparation				
1.2	Substructure				
1.3	Structure				
1.4	Architectural works | non-structural works				
1.5	Services and equipment				
1.6	Underground drainage				
1.7	External works				
1.8	Preliminaries | Contractor's site overheads				
1.9	Risk allowances				
1.10	Taxes and levies				
2	**Associated Capital Costs**				
2.1	Land or property acquisition				
2.2	Construction-related consultants and supervision				
2.3	Work and utilities outside site				
2.4	Post-completion furniture, furnishing and equipment				
2.5	Administrative, finance, legal and marketing expenses				
2.6	Risk allowances				

Comparison between Two Design Schemes

Notes:

- Additional columns may be added as appropriate.
- State 'Excluded' or 'N/A' (not applicable) as appropriate.
- **Project Attributes** and **Project Values** are not shown in this example, but would normally be provided.

Item	Description	Scheme A		Scheme B		B – A		
		$M	$/m²(IPMS 1 and 2)	$M	$/m²(IPMS 1 and 2)	$M	$/m²(IPMS 1 and 2)	%
	IPMS 1 Floor Area		m²		m²		m²	
	IPMS 2 Floor Area		m²		m²		m²	
0	**Total Project Capital Cost ('1' + '2')**							
1	**Construction Costs**							
1.1	Demolition and site preparation							
1.2	Substructure							
1.3	Structure							
1.4	Architectural works | non-structural works							
1.5	Services and equipment							
1.6	Underground drainage							
1.7	External works							
1.8	Preliminaries | Contractor's site overheads							
1.9	Risk allowances							
1.10	Taxes and levies							

Item	Description	Scheme A			Scheme B			B – A			
		$M	$/m^2(IPMS 1 and 2)		$M	$/m^2(IPMS 1 and 2)		$M	$/m^2(IPMS 1 and 2)		%
2	**Associated Capital Costs**										
2.1	Land or property acquisition										
2.2	Construction-related consultants and supervision										
2.3	Work and utilities outside site										
2.4	Post-completion furniture, furnishing and equipment										
2.5	Administrative, finance, legal and marketing expenses										
2.6	Risk allowances										

Combined Category Project

Notes:

- Additional columns for further **Project Categories** may be added as appropriate.
- **Project Attributes** and **Project Values** are not shown in this example, but would normally be provided.

Item	Description	Buildings			Access Roads		Total	
		$M	$/m^2(IPMS 1 and 2)		$M	$/m	$M	% of '0'
			m^2			m		
		IPMS 1 Floor Area			Road Length			
			m^2					
		IPMS 2 Floor Area						
0	**Total Project Capital Cost ('1' + '2')**							
1	**Construction Costs**							
1.1	Demolition and site preparation							
1.2	Substructure							
1.3	Structure							
1.4	Architectural works | non-structural works							
1.5	Services and equipment							
1.6	Underground drainage							
1.7	External works							
1.8	Preliminaries | Contractor's site overheads							
1.9	Risk allowances							
1.10	Taxes and levies							
2	**Associated Capital Costs**							
2.1	Land or property acquisition							
2.2	Construction-related consultants and supervision							
2.3	Work and utilities outside site							
2.4	Post-completion furniture, furnishing and equipment							
2.5	Administrative, finance, legal and marketing expenses							
2.6	Risk allowances							

Appendix F: Interface with International Property Measurement Standards (IPMS)

Measurement of Gross 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)). This permits the representation of overall costs in terms of currency per square metre.

Measurement guidelines and definitions vary considerably between countries. Linking **ICMS** with **IPMS** provides a valuable tool for overcoming these inconsistencies. **ICMS** requires a cost report to include both GEFA (**IPMS** 1) and GIFA (**IPMS** 2) measured in accordance with the rules set out in **IPMS**. **IPMS** is evolving on a building sector basis (offices, residential, retail and the like) and, although **IPMS** 1 will be consistent for all building types, **IPMS** 2 will therefore vary between different building types. These rules are summarised below, but reference to the specific standard, for the particular building type, is recommended.

IPMS 1: Gross External Floor Area

Use

IPMS 1 is used for measuring the area of a building including external walls.

Definition

IPMS 1 is the total of the areas of each floor of a building measured to the outer perimeter of external construction features, which may be reported on a component-by-component basis for each floor of a building. The definition is the same for all classes of building.

Inclusions

IPMS 1 includes all areas and walls, 'columns and enclosed walkways or passages between separate buildings, available for direct or indirect use. Covered void areas such as atria are only included at their lowest floor level' (*IPMS: Office buildings*, 3.2.2).

In the absence of external construction features, for example an open-sided building or a free-standing canopy, **IPMS** 1 is to be measured to the covered area.The 'area of basement levels is calculated by extending the exterior plane of the perimeter walls at ground level downwards, or by estimation of the wall thickness if the extent of the basement differs from the footprint of the building' (*IPMS: Office buildings*, 3.1.2).

Measurements included but stated separately

Balconies, covered galleries, internal catwalks, sheltered areas, internal permanent mezzanines and generally accessible rooftop terraces are included. They are to be measured to the outer face and their areas stated separately.

Exclusions

'Measurement for **IPMS** 1 is not to include the area of:

- open light wells or the upper level voids of an atrium
- open external stairways that are not an integral part of the structure, for example, an open framework fire escape' (*IPMS: Office buildings*, 3.1.2)
- external areas such as external vehicle parking, external catwalks, vehicle circulation and other areas or structures (such as equipment yards, cooling equipment, refuse areas), and patios and decks at ground level.

Measurement for **IPMS** 1 excludes any other ground-level areas or structures beyond the covered area. Such areas may be measured and stated separately.

IPMS 2: Gross Internal Floor Area

Use

IPMS 2 is used for measuring the internal area of a building.

Definition

IPMS 2 is the total area of each floor of a building measured to the internal dominant face (IDF), which may be reported on a component-by-component basis for each floor of a building. The definition is the same for all classes of building.

Inclusions

IPMS 2 includes all areas within the IDF, 'including internal walls, columns and enclosed walkways or passages between separate buildings, available for direct or indirect use. Covered void areas such as atria are only included at their lowest floor level' (*IPMS: Office buildings*, 3.2.2).

Measurements included but stated separately

Balconies, internal catwalks, covered galleries, internal loading bays, internal permanent mezzanines, verandas and generally accessible rooftop terraces are included. They are to be measured to their finished surface and their areas stated separately.

Exclusions

Measurement for **IPMS** 2 is not to include areas outside the external wall, temporary mezzanines or open light wells and the upper-level voids of an atrium. Such areas may be measured and stated separately.

Internal dominant face

The internal dominant face is the inside finished surface comprising more than 50% of the floor to ceiling height for each IDF wall section. If such does not occur, then the finished surface is deemed to be the IDF. IDF wall section refers to each internal finish of a section of an external wall that, ignoring the existence of any columns, is either recessed from, or protrudes from, its adjacent section.

If there is no IDF, because no face in an IDF wall section exceeds 50%, or if the IDF is not vertical, the measurement should be to the finished surface. When determining the IDF wall section, the following guidelines should be used:

- 'skirting boards and decorative elements are not classified as being part of a wall
- the existence of columns is ignored
- window frames and mullions are deemed to form part of the window
- air-conditioning units, ducting bulkheads and cornices are ignored' (*IPMS: Office buildings*, 3.2.3).

Appendix G: Bibliography

- Eurostat: http://ec.europa.eu/eurostat
- International Property Measurement Standards: www.ipmsc.org
- International Standard Industrial Classification of all Economic Activities (ISIC Rev,.4): http://unstats.un.org/unsd/cr/registry/regcst.asp?Cl=27
- ISO 12006-2: 2015, *Building construction – Organization of information about construction works. Part 2: Framework for classification*
- ISO 3166-2: 2013, *Codes for the representation of names of countries and their subdivisions – Part 2: Country subdivision code*
- ISO 4217: 2015, *Codes for the representation of currencies*
- ISO 6707-1: 2014, *Buildings and civil engineering works – Vocabulary – Part 1: General terms*