National Engineering 2018

at IMPACT Muang Thong Thani, Nonthanburi, Thailand

International Forum

EIT Standard Cost Code & ICMS Cost Code for International Mega Project Management

14:15 – 16:15, 1 November 2018

Presentation by
Surveyor TANG Ki-cheung, FHKIS, FHKIVM, FCECA

EIT = The Engineering Institute of Thailand under H.M. The King's Patronage
ICMS = International Construction Measurement Standards

Surveyor TANG Ki-cheung, FHKIS, FHKIVM, FCECA

Mr. TANG Ki-cheung is a professional quantity surveyor with over 42 years' experience and has handled over 860 projects.

He is a fellow member of The Hong Kong Institute of Surveyors, the Hong Kong Institute of Value Management, and the China Engineering Cost Association.

He is the Managing Director of K C Tang Consultants Ltd. (Quantity Surveyor : Construction Cost and Contract Consultants) in Hong Kong.

He has served the education, accreditation and building information modelling committees of the Hong Kong Institute of Surveyors and the Pacific Association of Quantity Surveyors.

He has drafted Hong Kong's Standard Form of Contract for Maintenance and Renovation Works, chaired the drafting of Hong Kong's Standard Contracts Provisions for Domestic Subcontracts.

He is a member of the Standards Setting Committee responsible for the drafting of the International Construction Measurement Standards with the first edition on capital costs released in July 2017 and with the second edition covering life cycle costing to be released soon for consultation.

Need for Pre-construction Estimates

- Know the costs for investment decisions:
  - Calculate land bid price
  - Calculate acceptable rental
  - Evaluate the feasibility of the investment
- Establish a project (development) budget
- Obtain funding
- Borrow money from the bank
- Formulate a design brief which defines the scope and standard of the project
- Monitor the design development to control the costs within budget

Best Time to Plan and Control the Costs

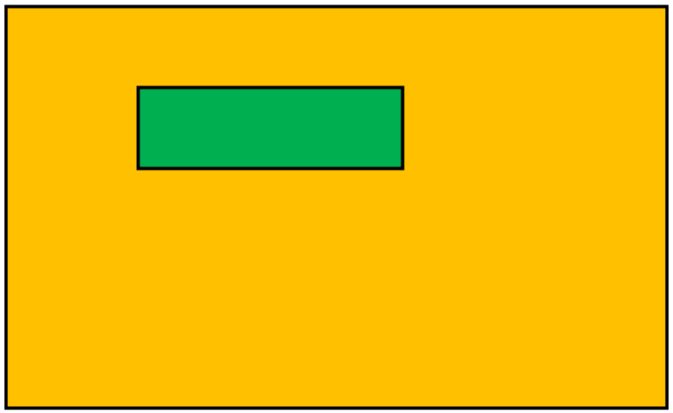
- As early as possible during the development process
- Better chances to make design changes to find a better solution
- To reduce abortive design costs

Ways to Calculate the Cost Estimates

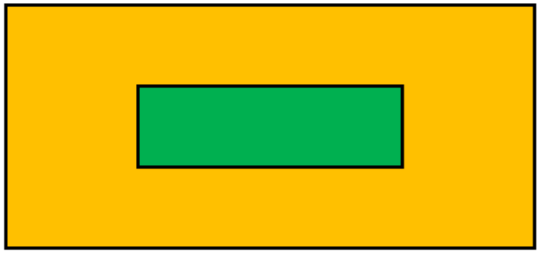
- Estimates should be done using expedient methods, approximations and shortcuts to reduce estimating time and costs in order to afford more estimates
- By cost per floor area estimates
- By measuring the most significant cost parameters
- By measuring elemental quantities
- By measuring approximate quantities
- By pricing the bills of quantities ready for issuance or already issued for tendering

Cost Geometry

SAME BUILDING



Big site



Small site

Costs of site works and external works very different between the two schemes.
They must be separated for cost estimating.

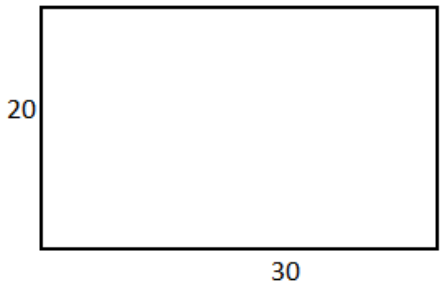
Cost Geometry

One-storey building

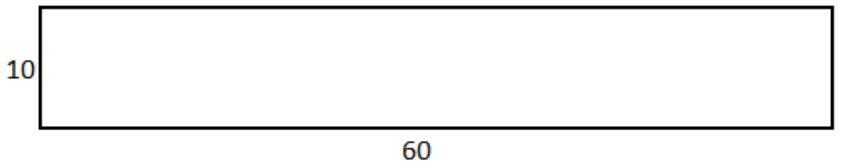
Two-storey building

Floor area doubled.
Roof costs the same.
Substructure costs would not be doubled.
Costs of roof and substructure must be separated.

Cost Geometry



Area = 20 x 30 = 600
Perimeter = (20 + 30) x 2 = 100

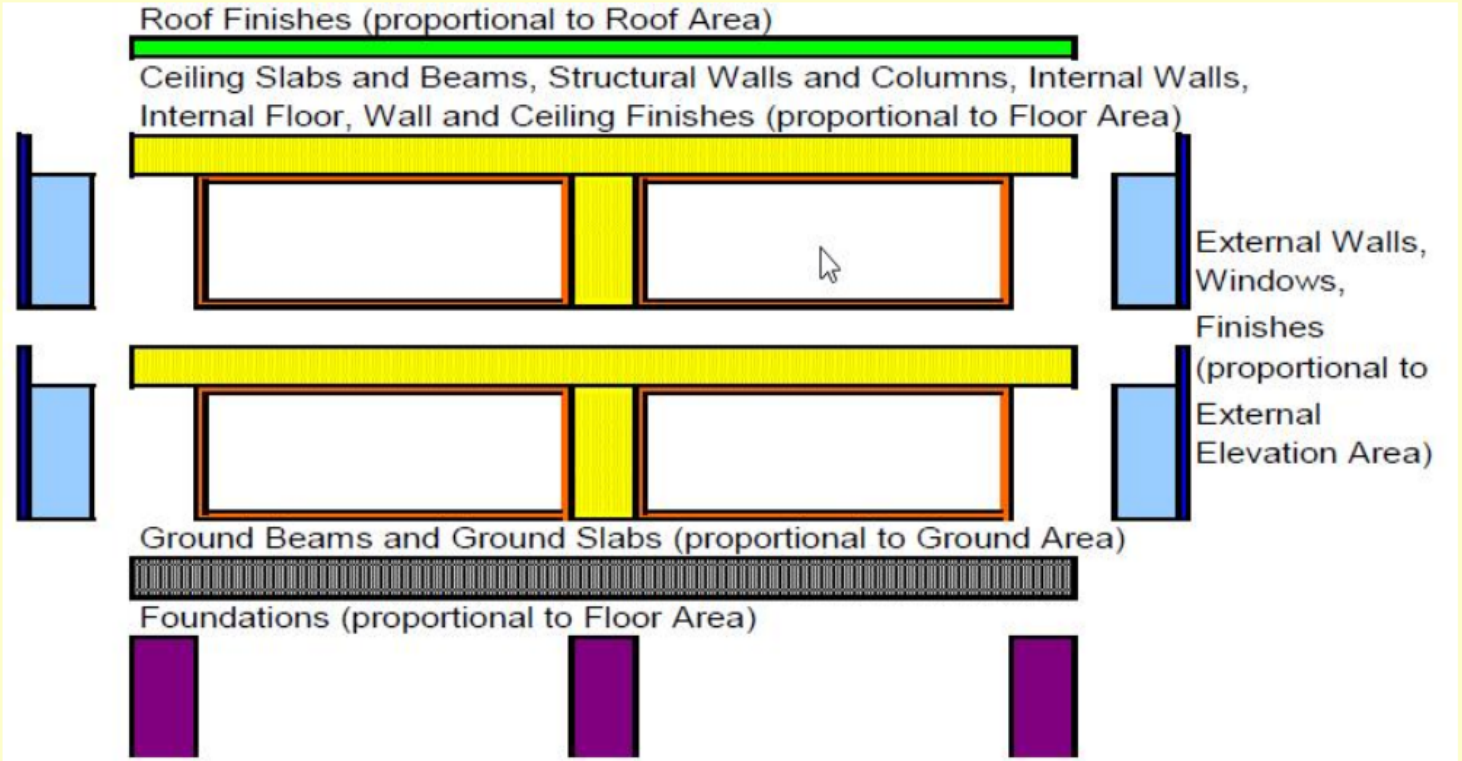


Area = 10 x 60 = 600
Perimeter = (10 + 60) x 2 = 140

Perimeter / elevation areas different for the same floor area.
Costs of elevations must be separated.

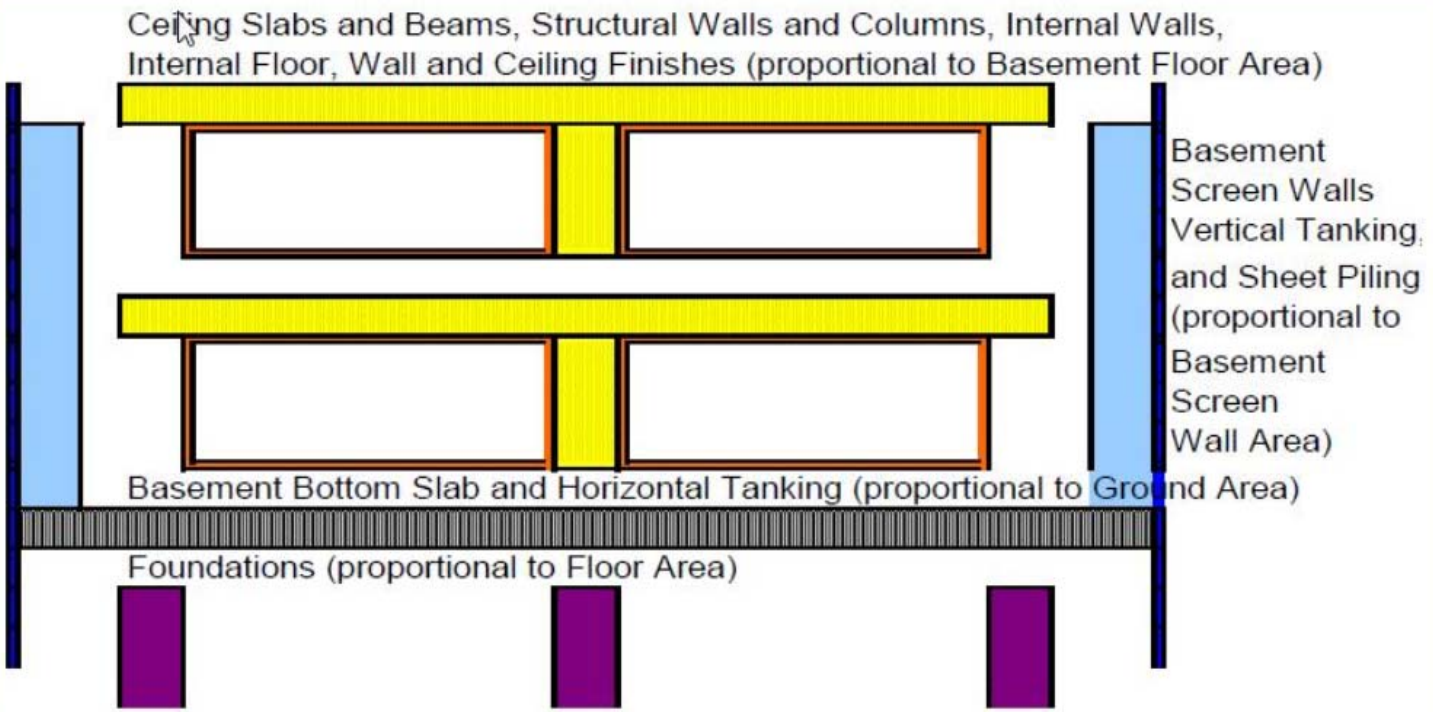
Cost Geometry

Without basement



Cost Geometry

Basement



Cost Parameters

To enable quick estimating and to benchmark project costs:

- Floor Area
- Ground Area and Roof Area
- External Elevation Area
- External Area
- Number of equipment
- Refrigeration Tonnage
- Other elemental quantities

Elemental Cost Classifications

- Many countries have elemental cost classification standards
- Hong Kong government projects use the elemental unit costs to benchmark new projects for funding approval
- Different countries' standards are quite similar in broad terms
- But the demarcation between different elements / groups of costs can be quite different
- This makes comparing and benchmarking costs estimated using different standards difficult

ICMS INTERNATIONAL CONSTRUCTION MEASUREMENT STANDARDS

International Construction Measurement Standards: Global Consistency in Presenting Construction Costs

International Construction Measurement Standards Coalition

July 2017

1st edition

ICMS

- ICMS are a high level cost classification system
- to provide global consistency in:
  - classifying
  - defining
  - measuring
  - analysing and
  - presenting
- entire construction costs at
- a project, regional, state, national or international level

ICMS - Timeline

- June 2015 – Kick-off meeting at International Monetary Fund
- ICMS Coalition (https://icms-coalition.org/) – non-governmental, not-for-profit professional coalition – 47 member organizations
- Standards Setting Committee – experts from 16 countries
- July 2016 – Consultation draft
- October 2016 – completion of private consultation
- November 2016 and April 2017 – public consultations
- July 2017 - First Edition – Capital Costs
- Mid 2019 - Second Edition – Life Cycle Costs

Coalition members

1. *Africa Association of Quantity Surveyors (AAQS)*
2. *Association for the Advancement of Cost Engineering*
3. *International (AACE)*
4. *Association of Cost Engineers (ACostE)*
5. *Association of South African Quantity Surveyors (ASAQS)*
6. *Australian Institute of Quantity Surveyors (AIQS)*
7. *Brazilian Institute of Cost Engineers (IBEC)*
8. *Building Surveyors Institute of Japan (BSIJ)*
9. *Canadian Institute of Quantity Surveyors (CIQS)*
10. *Chartered Institute of Building (CIOB)*
11. *Chartered Institution of Civil Engineering Surveyors (ICES)*
12. *China Electricity Council (CEC)*
13. *China Engineering Cost Association (CECA)*
14. *Commonwealth Association of Surveying and Land Economy (CASLE)*
15. *Conseil Europeen des Economistes de la Construction (CEEC)*
16. *Consejo General de la Arquitectura Técnica de España (CGATE)*
17. *Dutch Association of Quantity Surveyors (NVBK)*
18. *European Federation of Engineering Consultancy Associations*
19. *(EFCA)*
20. *Federation Internationale des Geometres (FIG)*
21. *Fiji Institute of Quantity Surveyors (FIQS)*
22. *Ghana Institution of Surveyors (GhIS)*
23. *Hong Kong Institute of Surveyors (HKIS)*
24. *Ikatan Quantity Surveyor Indonesia (IQSI)*
25. *Indian Institute of Quantity Surveyors (IIQS)*
26. *Institute of Engineering and Technology (IET)*
27. *Institute of Quantity Surveyors of Kenya (IQSK)*
28. *Institute of Quantity Surveyors Sri Lanka (IQSSL)*
29. *Institution of Civil Engineers (ICE)*
30. *Institution of Surveyors Kenya (ISK)*
31. *Institution of Surveyors of Uganda (ISU)*
32. *International Cost Engineering Council (ICEC)*
33. *Italian Association for Total Cost Management (AICE)*
34. *Korean Institution of Quantity Surveyors (KIQS)*
35. *New Zealand Institute of Quantity Surveyors (NZIQS)*
36. *Nigerian Institute of Quantity Surveyors (NIQS)*
37. *Pacific Association of Quantity Surveyors (PAQS)*
38. *Philippine Institute of Certified Quantity Surveyors (PICQS)*
39. *Property Institute of New Zealand (PINZ)*
40. *Real Estate Institute of Botswana (REIB)*
41. *Royal Institute of British Architects (RIBA)*
42. *Royal Institution of Chartered Surveyors (RICS)*
43. *Royal Institution of Surveyors Malaysia (RISM)*
44. *Singapore Institute of Building Limited (SIBL)*
45. *Singapore Institute of Surveyors and Valuers (SISV)*
46. *Sociedad Mexicana de Ingeniería Económica, Financiera y de Costos*
47. *Society of Chartered Surveyors Ireland (SCSI)*
48. *Union Nationale des Economistes de la Construction (UNTEC)*

Standards Setting Committee

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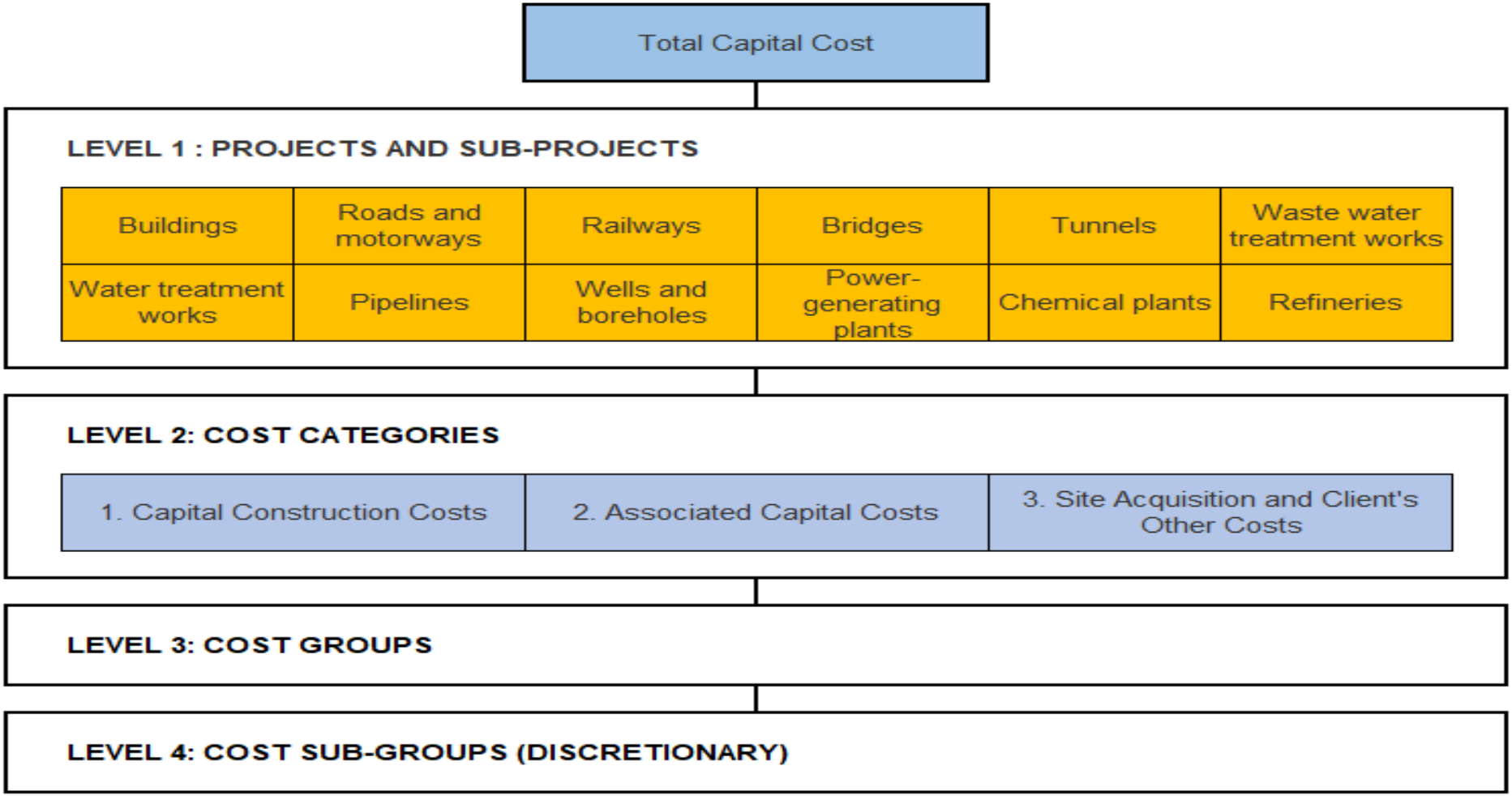
23. Tang Ki-Cheung (Hong Kong)

ICMS Framework

ICMS FRAMEWORK



Level 2	Cost Categories
Level 3	Cost Groups

0	Total Capital Cost ("1"+"2"+"3")

1	Capital Construction Costs
1.01	Demolition, site preparation and formation
1.02	Substructure
1.03	Structure
1.04	Architectural works | Non-structural works
1.05	Services and equipment
1.06	Surface and underground drainage
1.07	External and ancillary works
1.08	Preliminaries | Constructor's site overheads | general requirements
1.09	Risk Allowances
1.10	Taxes and Levies

2	Associated Capital Costs
2.01	Work and utilities off-site
2.02	Post-completion loose furniture, fittings and equipment
2.03	Construction-related consultants and supervision
2.04	Risk Allowances

3	Site Acquisition and Client's Other Costs
3.01	Site acquisition
3.02	Administrative, finance, legal and marketing expenses

Reporting Templates

Building project

Cost code	Description	Buildings			
		$M	$/m²	$/m²	% of '0'
	Project Quantity				
			IPMS 1 Floor Area (m²)	IPMS 2 Floor Area (m²)	
0	Total Capital Cost ('1' + '2' + '3')				
1	Capital Construction Costs				
1.01	Demolition, site preparation and formation				
1.02	Substructure				
1.03	Structure				
1.04	Architectural works | non-structural works				
1.05	Services and equipment				
1.06	Surface and underground drainage				
1.07	External and ancillary works				
1.08	Preliminaries | Constructor's site overheads | general requirements				
1.09	Risk Allowances				
1.10	Taxes and Levies				

Comparison between two design schemes

Cost code	Description	Scheme A				Scheme B				B–A		
		$M	$/m²	$/m²	% of '0'	$M	$/m²	$/m²	% of '0'	$M	$/m²	$/m²
	Project Quantity											
			IPMS 1 Floor Area (m²)	IPMS 2 Floor Area (m²)			IPMS 1 Floor Area (m²)	IPMS 2 Floor Area (m²)			IPMS 1 Floor Area (m²)	IPMS 2 Floor Area (m²)
0	Total Capital Cost ('1' + '2' + '3')											
1	Capital Construction Costs											
1.01	Demolition, site preparation and formation											
1.02	Substructure											
1.03	Structure											
1.04	Architectural works | non-structural works											
1.05	Services and equipment											
1.06	Surface and underground drainage											
1.07	External and ancillary works											
1.08	Preliminaries | Constructor's site overheads | general requirements											
1.09	Risk Allowances											
1.10	Taxes and Levies											

Project with Sub-Projects

Cost code	Description	Sub-Project								Total	
		Hotel			Apartment			Roads and motorways			
		$M	$/m²	$/m²	$M	$/m²	$/m²	$M	$/m	$M	% of '0'
	Project Quantity										
			IPMS 1 Floor Area (m²)	IPMS 2 Floor Area (m²)		IPMS 1 Floor Area (m²)	IPMS 2 Floor Area (m²)		Road Length (m)		
0	Total Capital Cost ('1' + '2' + '3')										
1	Capital Construction Costs										
1.01	Demolition, site preparation and formation										
1.02	Substructure										
1.03	Structure										
1.04	Architectural works | non-structural works										
1.05	Services and equipment										
1.06	Surface and underground drainage										
1.07	External and ancillary works										
1.08	Preliminaries | Constructor's site overheads | general requirements										
1.09	Risk Allowances										
1.10	Taxes and Levies										

Similar to the Sub-Project Template,
different sets of columns can be given for:

- Basement
- Commercial Podium
- Tower Hotel Floors
- Tower Apartment Floors
- Interior Fitting Out
- Common

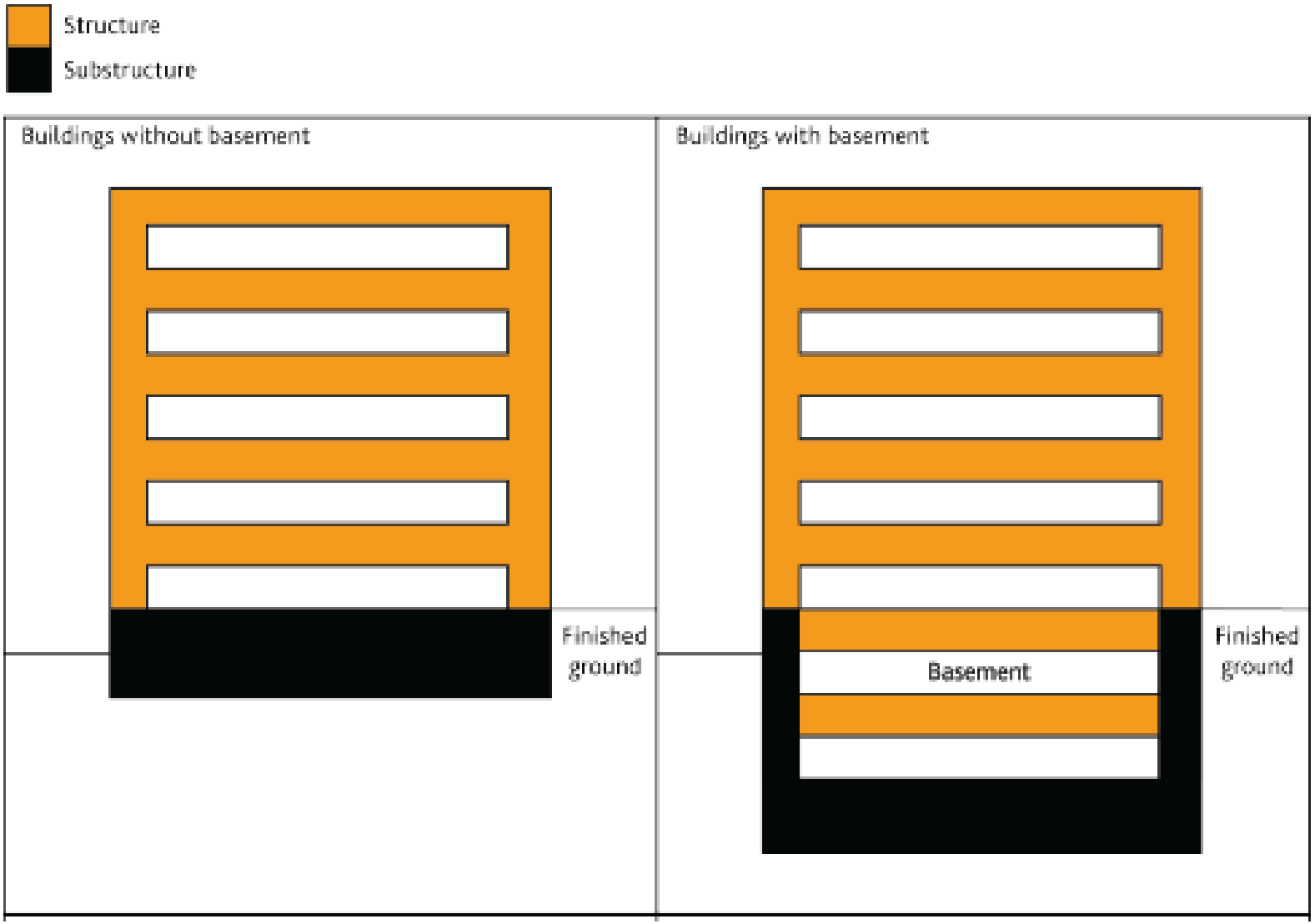
all classified by the same Cost Groups

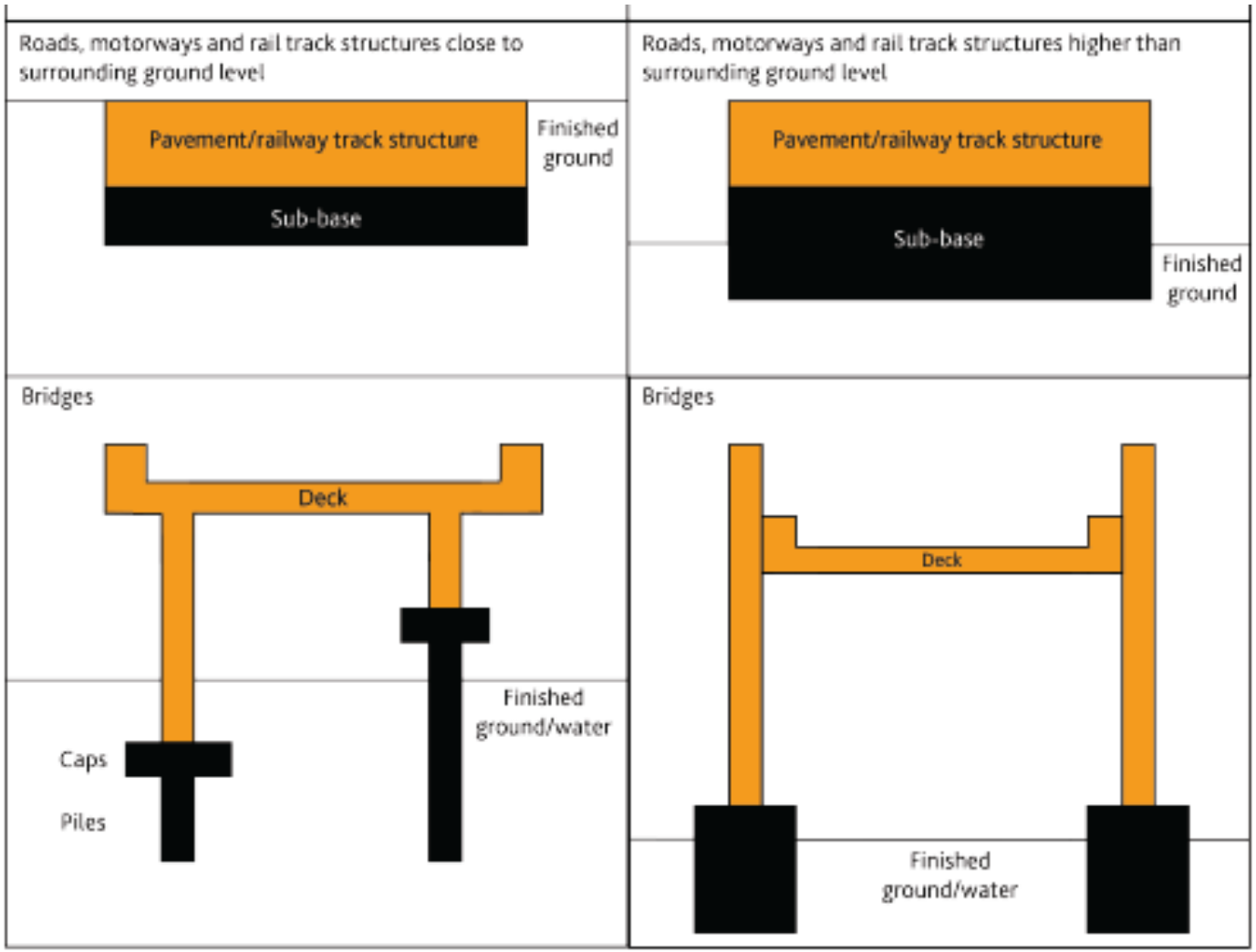
Project Quantities

Projects	Project Quantities (Physical)	Project Quantities (Functional)
Buildings	• Gross external floor area as IPMS 1 (m² | ft²) • Gross internal floor area as IPMS 2 (m² | ft²)	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
Roads and motorways	Paved area (m² | ft²)	capacity (vehicles per hour)
Railways	Route length (between two places, irrespective of number of tracks) (km | miles)	• weight of traffic expressed as estimated gross (million tonnes or tons per annum) • passenger journeys (million journeys per year)
Bridges	Surface area of deck (m² | ft²)	capacity (vehicles | litres | gallons | tonnes | tons per hour)
Tunnels	Volume of excavation (m³ | yd³)	capacity (vehicles | litres | gallons | tonnes | tons per hour)
Waste water treatment works	Site area (area of land covered by permanent work, excluding temporary working areas outside the site) (hectares | acres)	capacity (litres | gallons per day)
Water treatment works	Site area (area of land covered by permanent work, excluding temporary working areas outside the site) (hectares | acres)	capacity (litres | gallons per day)
Pipelines	• Total length of pipes (km | miles)	capacity (litres | gallons | m³ | ft³ per hour)
	• Length from servicing inlets to outlets (km | miles)	
Wells and boreholes	Total length drilled/bored (m | ft)	capacity (m³ | ft³ | litres | gallons per hour)
Power generating plants	Site area (area of land covered by permanent work, excluding temporary working areas outside the site) (hectares | acres)	capacity (MW)
Chemical plants	Site area (area of land covered by permanent work, excluding temporary working areas outside the site) (hectares | acres)	output of product (m³ | ft³ | tonnes | tons | litres | gallons per day)
Refineries	Site area (area of land covered by permanent work, excluding temporary working areas outside the site) (hectares | acres)	• input of crude oil (tonnes | tons | litres | gallons | barrels per day) • output of product (tonnes | tons | litres | gallons | barrels per day)

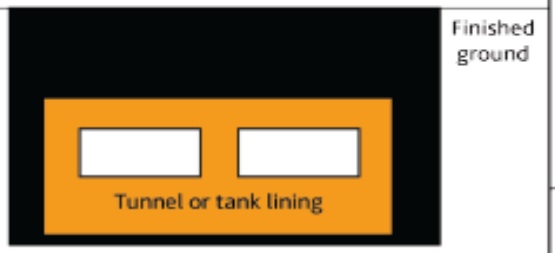
Substructure and Structure

("SUPERSTRUCTRE" not used)


Structure
Substructure
Buildings without basement
Finished ground
Buildings with basement
Basement
Finished ground


Roads, motorways and rail track structures close to surrounding ground level
Pavement/railway track structure
Sub-base
Finished ground
Roads, motorways and rail track structures higher than surrounding ground level
Pavement/railway track structure
Sub-base
Finished ground
Bridges
Deck
Caps
Piles
Finished ground/water
Bridges
Deck
Finished ground/water

Tunnels and tanks underground

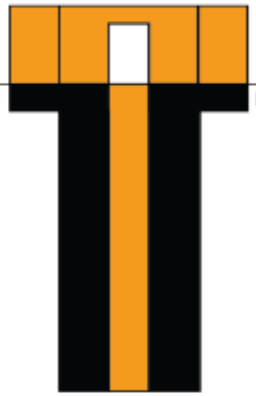


Tanks above ground

Pipelines underground

Pipelines above ground

Wells and boreholes



Waste water treatment works, water treatment works, power-generation plants, chemical plants and refineries

Use the same principles as illustrated above

ICMS and EIT Cost Codes

ICMS - Level 4 - Cost Sub-Groups for Buildings

Cost Code	Description
	Cost Category (Level 2)
	Cost Group (Level 3)
	Cost Sub-Group (Level 4)
0	**TOTAL CAPITAL COST (1+2+3)**
1	**Capital Construction Costs**
1.01	**Demolition and site preparation**
1.01.010	Site survey and investigation
1.01.020	Environmental treatment
1.01.030	Sampling for construction, geophysical, geological or similar purposes
1.01.040	Temporary fencing
1.01.050	Demolition of existing buildings and support to adjacent structures
1.01.060	Site surface clearance (clearing, grubbing, topsoil stripping, tree felling, minor earthwork, removal)
1.01.070	Tree transplant
1.01.080	Site formation and slope treatment
1.01.090	Temporary surface drainage and dewatering
1.01.100	Temporary protection, diversion and relocation of public utilities
1.02	**Substructure**
1.02.010	Foundation piling and underpinning
1.02.020	Foundations up to top of lowest floor slabs
1.02.030	Basement sides and bottom
1.03	**Structure**
1.03.010	Structural removal and alterations
1.03.020	Basement suspended floors (up to top of ground floor slabs)
1.03.030	Frames and slabs (above top of ground floor slabs)
1.03.040	Tanks, pools, sundries

EIT Cost Code for Building Rev. 02

Cost Code	Description
5	**ELEMENTAL DEMOLITION AND SPECIAL CONSTRUCTION WORK**
6	**SITE WORK AND LANDSCAPE**
5.1	Building Element Demolition Work
6.1	Site Preparation
1	**STRUCTURAL WORK**
1.1	Sub-structure
1	**STRUCTURAL WORK**
1.2	Super-structure

1.02	Substructure
1.02.010	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
1.02.020	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
1.02.030	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

1.03	Structure
1.03.010	Structural removal and alterations
1.03.020	Basement suspended floors (up to top of ground floor slabs): 010 – structural walls and columns 020 – beams and slabs 030 – staircases
1.03.030	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
1.03.040	Tanks, pools, sundries

ICMS - Level 4 - Cost Sub-Groups for Buildings

Cost Code	Description
	Cost Category (Level 2)
	Cost Group (Level 3)
	Cost Sub-Group (Level 4)
1.04	**Architectural works | Non-structural works**
1.04.010	Non-structural removal and alterations
1.04.020	External elevations
1.04.030	Roof finishes, skylights and landscaping (including waterproofing and insulation)
1.04.040	Internal divisions
1.04.050	Fittings and sundries
1.04.060	Finishes under cover
1.04.070	Builder's work in connection with services

EIT Cost Code for Building Rev. 02

Cost Code	Description
2	**ARCHITECTURAL WORK**
2.2	External Architectural Work
2.1	Internal Architectural Work
3	**INTERIOR DECORATIVE WORK**
3.2	Built-in Work
3.3	Interior Movable Work
3.4	Signage
3.5	Equipment
3.1	Fit-out Work

1.04.020	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
1.04.030	Roof finishes, skylights and landscaping (including waterproofing and insulation): 010 – roof finishes 020 – skylights 030 – other roof features 040 – roof landscaping (hard and soft)

1.04.040	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

1.04.050	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

1.04.060	Finishes under cover: 010 – floor finishes (internal and external) 020 – internal wall finishes and cladding 030 – ceiling finishes and false ceilings (internal or external)
1.04.070	Builder's work in connection with services: 010 – plinth, bases 020 – fire-proofing enclosure 030 – hoisting beams, lift pit separation screens 040 – suspended manholes 050 – cable trenches, trench covers 060 – sleeves, openings and the like not allowed for in 'Fittings and sundries'

ICMS - Level 4 - Cost Sub-Groups for Buildings

Cost Code	Description
	Cost Category (Level 2)
	Cost Group (Level 3)
	Cost Sub-Group (Level 4)
1.05	**Services and equipment**
1.05.010	Heating, ventilating and air-conditioning systems/air conditioners
1.05.020	Electrical services
1.05.030	Fitting out lighting fittings
1.05.040	Extra low voltage electrical services
1.05.050	Water supply and above ground drainage
1.05.060	Supply of sanitary fittings
1.05.070	Disposal systems
1.05.080	Fire services
1.05.090	Gas services
1.05.100	Movement systems
1.05.110	Gondolas
1.05.120	Turntables
1.05.130	Generators
1.05.140	Energy-saving features
1.05.150	Waste water treatment
1.05.160	Fountains, pools and filtration plant
1.05.170	Powered building signage
1.05.180	Kitchen equipment
1.05.190	Cold room equipment
1.05.190	Laboratory equipment
1.05.200	Medical equipment
1.05.210	Hotel equipment
1.05.220	Car park or entrances access control
1.05.230	Domestic appliances
1.05.240	Other specialist services
1.05.250	Builder's profit and attendance on services

EIT Cost Code for Building Rev. 02

Cost Code	Description
4	**BUILDING SYSTEM WORK**
4.5	Heating, Ventilating and Air-conditioning Systems
4.3	Electrical System
4.4	Communication System
4.1	Sanitary System
4.2	Fire Suppression
4.7	Gas System
4.6	Conveying System

ICMS - Level 4 - Cost Sub-Groups for Buildings

Cost Code	Description
	Cost Category (Level 2)
	Cost Group (Level 3)
	Cost Sub-Group (Level 4)
1.06	**Surface and underground drainage**
1.06.010	Surface water drainage
1.06.020	Storm water drainage
1.06.030	Foul water drainage
1.06.040	Drainage disconnections and connections
1.06.050	CCTV inspection of existing or new drains
1.07	**External and ancillary works**
1.07.010	Permanent retaining structures
1.07.020	Site enclosures and divisions
1.07.030	Ancillary structures
1.07.040	Roads and paving
1.07.050	Landscaping (hard and soft)
1.07.060	Fittings and equipment
1.07.070	External services

EIT Cost Code for Building Rev. 02

Cost Code	Description
6	**SITE WORK AND LANDSCAPE**
6.2	Hardscape and Related System Works
6.3	External Softscape and Related System Works
6.5	Movable Artworks and Objects
6.4	Exterior System Works

ICMS - Level 4 - Cost Sub-Groups for Buildings

Cost Code	Description
	Cost Category (Level 2)
	Cost Group (Level 3)
	Cost Sub-Group (Level 4)
1.08	**Preliminaries | Constructor's site overheads | general requirements**
1.08.010	Construction management including site management staff and support labour
1.08.020	Temporary access roads and storage areas, traffic management and diversion (at the Constructors' discretion)
1.08.030	Temporary site fencing and securities
1.08.040	Commonly shared construction plant
1.08.050	Commonly shared scaffolding
1.08.060	Other temporary facilities and services
1.08.070	Technology and communications telephone, broadband, hardware, software
1.08.080	Constructor's submissions, reports and as-built documentation
1.08.090	Quality monitoring, recording and inspections
1.08.100	Safety, health and environmental management
1.08.110	Insurances, bonds, guarantees and warranties
1.08.120	Constructor's statutory fees and charges
1.08.130	Testing and commissioning
1.09	**Risk Allowances**
1.09.010	Design development allowance
1.09.020	Construction contingencies
1.09.030	Price Level Adjustments
1.09.040	Exchange rate fluctuation adjustments
1.10	**Taxes and Levies**
1.10.010	Paid by the Constructor
1.10.020	Paid by the Client in relation to the construction contract payments

EIT Cost Code for Building Rev. 02

Cost Code	Description
0	**EXPENSE**
0.1	Site Expenses
0.2	Indirect Cost

Project Attributes and Values

Project Attributes	Project Values
Common (Project level only)	
Report	
Project title	
Status of cost report	pre-construction forecast | at tender | during construction | actual costs of construction post-completion
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 Organisation for Standardisation (ISO) country code (e.g. CN) | address of building site(s) | start and end locations for linear civil engineering works
Sub-Projects included	buildings | roads and motorways | railways | bridges | tunnels | waste water treatment works | water treatment works | pipelines | wells and boreholes | power-generating plants | chemical plants | refineries | common | other stated
Price Level	
ISO currency code	(e.g. USD)
Base date of costs	(month and year)
Price basis	fixed | fluctuating
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)

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 refurbishment | temporary
Grade (qualitative description to be read in conjunction with the location)	ordinary quality | medium quality | high quality
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 Capital Construction Costs
Project Complexity	
• shape (on plan)	circular, elliptical or similar | square, rectangular, or similar | complex
• design	simple | bespoke | complex
• method of working	sectional completion | out-of-hours working | confined working | other stated

Roads 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. Elevated roads and motorways that are an integral part of bridges shall be included in bridges)	
Code	
Local functional classification standard	
- name of standard	
- code number of construction	
Works	
Functional type	motorway | highway | freeway | expressway | road | lane
Nature	new build | major refurbishment | temporary
Environmental grade	
- grade and name of environmental certification	
- status	targeted | achieved | none
Principal design features	
- position	at grade | in cutting | in tunnel | 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	

End. Thank you!