PPP Canada

PPP Canada

Schematic Design Estimate Guide

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PPP Canada is the government of Canada's centre of expertise on P3s. A federal Crown corporation, it is mandated to improve the delivery of public infrastructure by achieving better value, timeliness and accountability to taxpayers, through P3s. The Corporation was created to deliver more P3s by leveraging incentives, demonstrating success, providing expertise; and promoting best practices and capacity-building.

Increasing the visibility of PPP Canada, through the Corporation's work as a procurement solution for governments is one of the major accomplishments of PPP Canada. The Corporation's work and the strategies it employs on its three (3) business lines:

P3 Knowledge Development and Sharing: to serve as a source of expertise and advice on public-private partnership matters;

Advancing Federal P3s: as the lead on federal P3 matters with a mandate to assess federal P3 opportunities; and to advise on the execution of federal P3 projects; and

Advancing Provincial, Territorial, Municipal and First Nations P3s: to assess the suitability of P3 projects from provincial, territorial, municipal, and First Nations governments seeking funding from federal infrastructure programs, in particular the P3 Canada Fund.

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1 INTRODUCTION

1.1 Overview

The purpose of this Guide is to provide Project Sponsors with the minimum requirements for preparing cost estimates suitable for quantitative analysis when considering a Public-Private Partnership (P3). As key inputs to the financial models, cost estimates form the basis of the selection of the preferred delivery option.

Accuracy in cost estimates is essential for P3 projects. Research shows that gaps between estimated and actual project costs have been significant. For example, a recent report from the Joint Federal Government/Industry Cost Predictability Taskforce examining traditional procured projects found that "40% of tenders had low bids that varied, either up or down, by more than 30% from the pre-tender estimate and fewer than 20% of tenders had bids within 10% of the estimate."[1] Variations were determined to be independent of market bidding behavior and were primarily influenced by the techniques used to forecast project costs.

Many of the projects included in the Taskforce's Guide worked with complete or nearly complete designs when preparing cost estimates. However, in a P3 project the Project Sponsor undertakes minimal design work in order to encourage design innovation and integration. Cost estimates based on partial designs are required to carry sufficient contingencies in order to address the level of inaccuracy inherent to partial designs. By including contingencies, Project Sponsors will be able to identify and assess the likely high-end of estimated cost ranges to secure a sufficient budget to pursue the projects. Estimates that are inaccurate or that lack contingencies will be rejected by participating firms when Project Sponsors publish affordability limits. This may lead to a failed procurement process.

This Guide highlights industry best practices that are based on the approaches, requirements and outputs at the Schematic Design Stage. Greater consistency in presentation of cost estimates will allow for easy verification, make it possible to benchmark costs against publicly verifiable construction cost databases, and allow for the comparison of results across projects over time.

In addition, this Guide outlines an approach to presenting results in a Cost Report along with an Elemental Cost Analysis.

[1] Joint Federal Government / Industry Cost Predictability Taskforce (2012) "Guide to Cost Predictability in Construction: An Analysis of Issues Affecting the Accuracy of Construction Cost Estimates".

1.2 Understanding Cost Estimates

The quality and accuracy of estimates depends on the level of advancement of the design for the project (refer to **Table 1**). For this reason, different sets of cost estimates will be prepared at different stages of design development. At an early stage, estimates will be at a high level. As the design becomes more specific with needs and requirements identified, more detailed cost estimates directly linked to the design specifications will be prepared. As the project definition and design evolve, cost estimates become more accurate. This Guide recommends that P3 cost estimates provide a level of cost accuracy of +/-15%, which typically requires that they be prepared on the basis of a Schematic Design. A Schematic Design encompasses plans, elevations, sections, and palettes of materials that generally represents 30% design completion. These inputs are used by Cost Consultants to prepare a Schematic Design Estimate, which is at a Class C level. This approach allows for the development of robust project cost estimates for decision-making, while minimizing any potential to impede innovation and duplicate the efforts undertaken by the Project Sponsor.

Traditionally, cost estimates in Canada have been classified into one of four categories, using Classes A, B, C and D.

Class A estimates are pre-tender estimates, based on completed construction drawings and detailed specifications contained in tender documents. They are expected to be quite accurate, within 5-10% of the actual contract price.

Class B estimates are design estimates based on an advanced project design. They are based on design drawings, project specifications and include detail on the design of electrical, mechanical and IT systems, as well as site requirements.

Class C is a planning level estimate usually based on a Schematic Design and presented in Elemental Format (a budget setting format/technique which considers the major elements of a project and provides an order of cost estimate based on an Elemental Cost Analysis of a building project). Typically, Class C estimates are required by the Project Sponsor to obtain preliminary approvals necessary to undertake design and project development. These estimates establish a preliminary budget estimate and a baseline against which project costs will be assessed at future project development milestones.

Class D estimates are conceptual estimates based on the project scope (the work that needs to be accomplished to deliver the project) and functional requirements (the output specifications/ deliverables of a project), and are usually presented in unit cost analysis format (applying a monetary rate to an element, sub-element or component per unit of measurement), such as cost per m^2.

Table 1: Generic Design and Cost Estimate

	PRIMARY CHARACTERISTICS	SECONDARY CHARACTERISTICS			
Estimate Classification	**Project Definition**	**Intended Purpose**	**Methodology**	**Level of Precision**	**Preparation Effort** % of project costs[2]
Class A	Design Documents (100% Design)	Compliance with effective project approval (budget)	Measured, priced, full detail quantities	-5% to +10%	5% to 50%
Class B	Design Development (66% Design)	Seeking effective project approval	Mainly measured, priced, detail quantities	-10% to +15%	2.5% to 10%
Class C	Schematic Design (33% Design)	Seeking preliminary project approval	Measured, priced, parameter quantities, where possible	-15% to +20%	1.5% to 5%
Class D	Design	Screening of various alternative solutions	Various	-20% to + 30%	0.5%

Within a class of estimates, the amount of underlying design and technical work can vary significantly from one asset class to another, giving rise to a misperception of the level of accuracy. For example, a Class D estimates could range from the use of very rough estimates of floor space requirements priced at average real estate pricing using general market indices to quite well specified space estimates with room requirements using m^2 pricing from similar projects.

1.3 Design under Public Private Partnerships

In a Public-Private Partnership (P3), the design function is integrated with construction, operations and maintenance phases under the responsibility of the private partner. In order to assess the timing, costs and risks involved in a project, the Sponsor must clearly define its project objectives and scope. As part of the competitive procurement process, Proponents are given the performance requirements and asked to propose designs that meet the Sponsor's needs. Proponents will develop their own designs, typically to between 30% and 50% design completion and submit them for evaluation as part of the technical submissions in the Request for Proposals (RFP) stage of procurement.

[2] The Association for the Advancement of Cost Engineering (2011) "Recommended Practice No. 17R-97 – Cost Estimate Classification System

The selected Proponent transfers the costs incurred for design to the Project Sponsor through the bid price. For this reason, Sponsors prefer to minimize the level of design completed prior to procurement in order to avoid incurring costs twice.

Generally, Sponsors strive to achieve the project design to +/- 15% to 20% level of cost accuracy at 20% to 30% of design completion, which is equivalent to Class C estimate in **Table 1**. This is consistent with best practices outlined by the Association for the Advancement of Cost Engineering (AACE) International's Recommended Practice No. 18R-97II, which states that a 10% design provides an average accuracy of -20% to +30 % and a 40% design provides an average accuracy of -10% to +10%[3]. Based on these ranges, it is reasonable to assume that design work would need to approach the high end of current P3 practices (i.e. 30% design), in order to achieve a level of cost analysis with an accuracy of +/- 15%. This level of accuracy balances a desire for greater accuracy with an appreciation of the added costs of further design development.

Apart from being duplicative of the efforts of the Proponents, design development could open the Sponsor to the risk of overly prescribing the project. In order to create incentives for innovation and obtain the best solutions possible, the Project Sponsor should define the needs and outputs that it requires. Moving into design development would mean that the needs and outputs could become tied to the specific design approach, as opposed to the true needs of the Sponsor. Therefore, it is recommended that P3 cost estimates are prepared to provide a Cost Analysis with an accuracy of +/- 15% which is generally supported by a Schematic Design at a 30% level.

1.4 Using the Guide

The Guide is presented as follows:

- Typical design information required for a Schematic Design Estimate
- Acceptable formats for a Schematic Design preparation
- Development of a Schematic Design Estimate
- Sector-Specific Considerations
- Outputs and Deliverables

The cost estimating methods, outputs and documentation are based on an accommodation facility. For other types of infrastructure, the required background information, elemental categories and outputs will vary, as discussed in the Outputs and Deliverables section. It is recommended that Sponsors seek advice from Technical Advisors and Cost Consultants regarding the appropriate approach to cost estimate accuracy for a particular sector.

[3] Association for the Advancement of Cost Engineering (2011) - AACE International Recommended Practice No. 18R-97: Cost Estimate Classification System – As Applied In Engineering, Procurement, And Construction For The Process Industries.

2 TYPICAL DESIGN INFORMATION REQUIRED FOR A SCHEMATIC DESIGN ESTIMATE

2.1 Minimum Requirements

The cost estimation process typically follows the main stages of design. The design process can be broken down into five stages:

1) Project Initiation
2) Conceptual Design
3) Schematic Design
4) Design Development
5) Design Document

In a traditional procurement process, the Project Sponsor is responsible for each of the five stages prior to tender. In P3 procurement, the Sponsor is responsible for the first three stages and the private partner is responsible for the design development and the preparation of final design and technical documents.

2.2 Project Initiation Stage

At the Project Initiation stage, the Sponsor identifies the need for the asset and defines the initial scope of the project. At this point, the focus will generally be on defining the issue, problem or opportunity to be addressed by new infrastructure in order to start shaping the project needs and requirements. The Project Sponsor will look at past experience within and outside the organization to address challenges and identify potential solutions. Typically, historical data on similar projects is gathered to better identify the scope of the project. For example, if the Sponsor has identified that there is a need for a new school, it will look at recently constructed schools in the vicinity and use the costs of those projects as a benchmark.

2.3 Conceptual Design Stage

At the Conceptual Design Stage, the Project Sponsor refines requirements for the infrastructure and begins to develop options to meet its needs. During this stage, the authority will develop a Functional Plan and specify its technical requirements. It will undertake pre-feasibility studies to identify technical options, define key project elements, gross floor areas or project characteristics (e.g. km of highway) and identify major equipment and component systems. At this stage, the Project Sponsor will typically begin to perform examinations of the proposed site to identify potential constraints.

The output of the Conceptual Design Stage is a report that illustrates the design concepts for the project. The report includes a discussion of the design objectives and how the design concepts address these objectives. The report includes drawings depicting the site layouts, floor plans and elevations.

It also outlines project constraints, high-level specifications and will define assumptions with respect to materials, major equipment and sub-systems. Finally, the report covers the proposed procurement approach, construction program and project timeline, along with a cost estimate and risk assessment.

2.4 Schematic Design Stage

The objective of the Schematic Design Stage is to test, resolve and amend the initial concept design and alternatives to produce a clearly defined design based on the Sponsor's requirements. During this stage, the project team designer will prepare plans, drawings and elevations to refine the Conceptual Design. The designs will be used to refine cost estimates, to further clarify the project scope and revise project timelines. A more detailed discussion on the Schematic Design Stage will be provided in section 3 of this Guide.

2.5 Design Development Stage

Industry best practices recommend that cost estimates are within +/- 15% degree of accuracy. This degree of accuracy is used to seek budget authority in preparation of Value-for-Money (VfM) analysis. Design and technical work need to be advanced to at least 30% completion in order to achieve this level of accuracy.

2.6 Design Document Stage

The generally acceptable levels of documentation that the Cost Consultant requires in order to produce a cost estimate within +/- 15% accuracy are produced by a consultant specializing in compliance or design. In the absence of the compliance documentation, which is illustrated in **Table 2**, the Cost Consultant must make reasonable assumptions and/or increase the level of estimating contingency (i.e. provide a lower level of accuracy).

Table 2 outlines the minimum requirements including the sources and documentation that are recommended for a Schematic Design Estimate:

Table 2: Minimum Design Work

ITEM	SOURCE	DOCUMENT
Schematic floor plans (30% completion) including basic statistics i.e. gross floor area, number of floors, number of parking spaces, etc.	Architect	Drawing/Outline Brief
As-built drawings for existing building (if applicable)	Project Sponsor	Drawing
Demolition drawings (if renovation), including clear indication of existing materials to remain	Architect	Drawing
Structural foundation system and typical framing plan; load requirements; and, specific foundation requirements to address geotechnical issues	Structural Engineer	Drawing
Building elevations and sections; perspectives and/or models; horizontal and vertical space relationships	Architect	Drawing
Roof system selections	Architect	
Guidelines for interior floor, wall and ceiling finishes	Architect	Drawing/Outline Brief
Schedule of mechanical requirements, including: volume and delivery rate of outdoor air to be supplied per person; plumbing system requirements; and, the area and location of mechanical spaces in the building	Mechanical Engineer	Drawing/Outline Brief
Outline specification (10% or higher), with selected equipment, sizing and performance requirements	All Consultants	Report
Paving and parking requirements	Traffic/Civil Consultant	Drawing/Report
Existing and proposed building grades	Civil Consultant	Drawing
General site plan layout	Civil/Landscaping Consultant	Drawing
Equipment inclusions and exclusions	Project Sponsor	Contribution Matrix
Original site drawings and investigations (if applicable)	Project Sponsor	Report
Storm drainage solution	Civil Consultant	Outline Brief
Existing utility location	Civil Consultant	Drawing
Site lighting requirements	Electrical Engineer	Outline Brief
Geotechnical Report	Geotechnical Consultant	Report
Environmental Report	Environmental Consultant	Report
Heritage Report, if applicable	Heritage Consultant	Report
Details if any restraints to project i.e. site access, working hours, labour etc.	Architect	Outline Brief
'Soft' cost inclusions and exclusions	Project Sponsor	Contribution Matrix
Functional Program	Planning Consultant	Report
Blocking/Stacking Diagrams	Architect	Drawing
Initial views on construction procurement options and contract strategies	Project Sponsor	Report

ITEM	SOURCE	DOCUMENT
Details of any enabling work, decanting and other specific requirements	Architect	Drawing
LEED or sustainable design requirements	Sustainable Design	Report
Comparable facilities, if any	Project Sponsor	Report
Phasing requirements, if any	Architect	Drawing
Project preliminary schedule	Schedule Consultant	MS Project or Similar
Occupancy requirements i.e. the facility operational during construction	Project Sponsor	Report
Proposed basic electrical, telecommunications and IT systems	Electrical Engineer	Drawing/Outline Brief

2.7 Typical General Work Plan

The typical general work plan consists of the following steps:

1. The Cost Consultant meets with the Project Sponsor and reviews the extent of all aspects of project costs that need to be incorporated in the cost estimate, in particular Furniture, Fittings and Equipment (FFE) requirements, Planning, Design, Compliance (PDC) fees, etc.
2. Based on the Project Sponsor's approved Schematic Design documents, the Cost Consultant meets with the design team and reviews the nature and scope of the entire project.
3. The Cost Consultant then prepares a budget cost estimate(s) and Elemental Cost Plan ("Cost Plan" - the critical breakdown of the cost limit for the building(s) into Cost Targets for each element of the building) for the Project Sponsor's review, that reflects the size and character of the entire project including the architectural, structural, mechanical and electrical systems, site and civil and such other Elements as may be appropriate. The cost estimate(s) and Cost Plan shall include backup sheets with quantities, unit rates and amounts for composite or individual items of work, as well as an Elemental Cost Summary. The estimate should also provide appropriate risk recommendations for estimating/design development, inflation, schedule, market conditions, site conditions and post-contract (change orders).
4. Ideally, the Cost Consultant should be involved as early as possible in the project and should take part in the initial project team meetings and the risk workshop(s) for the project. At the risk workshop, the Cost Consultant should be mandated to provide his/her professional opinion with regard to risks associated with:
    a. **Design development/estimating:**
    Risk that the Sponsor attempts to revise or impact the design of the project causing delays in the project.
    b. **Change order by Sponsor during construction:**
    Risk that the scope of work is changed by the Sponsor during the construction period.
    c. **Acute market conditions / construction price escalation:**
    Risk associated with construction costs being higher than estimated by the construction contractor. This results in higher costs and a reduced profit margin for the contractor.

d. **Procurement:**
   Risk that the procurement tender documentation is not complete. This will result in increased addenda and could give a sense of uncertainty to Proponents, resulting in reduced tolerance to risk and higher bids.

e. **Site access:**
   Risk of temporary closure of the site and delay in contract completion

f. **Site conditions/soil conditions/environmental risks:**
   Risks that environmental reports (i.e. geotechnical, archaeological) provided to Proponents contain errors. This could result in the contractor having a claim for additional time and costs. The magnitude of this risk will vary depending on particular site conditions. Proponents will insist that they can rely upon the environmental reports provided in the tender documentation.

5. The Cost Consultant then reviews draft estimates with the Sponsor and design team, and prepares any subsequent revisions. At the Schematic Design Stage, the Project Sponsor may request more than one Schematic Design resulting in more than one estimate to assist in the decision to move forward with one design option.
6. The agreed-upon budget cost estimate shall become the Cost Plan, and form the basis for cost control for the Project Sponsor moving forward.
7. The Cost Consultant finalizes the cost estimate and prepares an overall Cost Report.

3 ACCEPTABLE FORMATS FOR A SCHEMATIC DESIGN PREPARATION AND DEVELOPMENT OF A SCHEMATIC DESIGN ESTIMATE

3.1 Introduction

Meaningful cost comparisons and analyses of cost estimates will only be possible if cost data are based on a uniform standard analysis. The following section provides an overview of acceptable formats for a Schematic Design preparation by:

- Defining the Elemental Format
- Defining Selection of Elements
- Preparing Elemental Cost Analysis for an accommodation project
- Discussing design, estimation, escalation and construction allowances

The Cost Consultant should use the proposed, industry accepted, formats to ease analysis of results and to facilitate comparative elemental estimating.

3.2 Elemental Format

Elemental Cost Analysis "Cost Analysis" is a system of cost planning and control intended to monitor and control project costs during the design development of buildings and other structures. Cost control is achieved by preparing a Cost Plan based on the information contained in the analysis in the very early stages of a project when little is known about the materials or methods that will be used.

An Elemental Cost Analysis examines the known costs of a building at the end of the design process into an Elemental Format and divides the cost by a quantity to give a unit rate. A Cost Plan is used at the beginning of the design process and determines the required reserve. It multiplies a quantity by a unit rate obtained from one or more cost analyses to give a cost. To be useful, the breakdown and method of analyzing the costs in the Cost Analysis must therefore be identical to that used in the Cost Plan[4].

It is generally an accepted industry standard that a Schematic Design Estimate is prepared in Elemental Format which is approved by the Canadian Institute of Quantity Surveyor, (CIQS) or an equivalent format. Using industry standards makes the output understandable to a wide audience and allows for comparisons between projects.

[4] Canadian Institute of Quantity Surveyors (2006) "Elemental Cost Analysis: Format – Method Of Measurement – Pricing – Measurement of Buildings by Area & Volume, Canadian Institute of Quantity Surveyors.

3.3 Selection of Elements

An Element is defined as a major component common to most buildings, fulfilling the same function irrespective of its design, specification or construction. In selecting and defining the Elements the following CIQS principles are used[5]:

1. Each Element should have a significant influence on the cost of a structure and a high frequency of occurrence.
2. There should be consistency and simplicity in the definitions of Elements. One of the primary purposes of a standard list of Elements is to enable cost analyses of completed projects and to help control costs of future projects.
3. Each Element is intended to represent a component of the building which always performs the same function regardless of its composition. Any attempt to try to identify materials in a Cost Analysis defeats the purposes of a Cost Plan which is prepared when few, if any, materials have been selected.
4. Wherever possible an Element should be measurable.
5. The Elements are ordered hierarchically into four levels to allow for different levels of aggregation and summarization as follows:

a.	Level 1	Major Group Elements	- denoted by a single character code
b.	Level 2	Group Elements	- denoted by a two character code
c.	Level 3	Elements	- denoted by a three character code
d.	Level 4	Sub-Elements	- denoted by a four character code

For example:	A	SHELL	Level 1
	A1	Substructure	Level 2
	A11	Foundations	Level 3
	A111	Standard Foundations	Level 4

A more detailed sample of an Elemental Format for an accommodation project, which is consistent with the CIQS standard, is provided in the sub-section below. Potential adaptations for other asset classes will be discussed in the next section (e.g., UNIFORMAT II).

[5] Association for the Advancement of Cost Engineering (2011) - AACE International Recommended Practice No. 18R-97: Cost Estimate Classification System – As Applied In Engineering, Procurement, And Construction For The Process Industries.

3.4 Preparing an Elemental Cost Analysis

All Elements of an Elemental Cost Analysis should be shown in the same sequence for easy reference. CIQS and UNIFORMAT use numbering systems that lay out Elemental Estimates in a standard order, generally corresponding to the order of construction. If no cost is attributable to an Element, a zero or dash should be entered in the cost column. For analysis purposes the cost of each Element is expressed in a separate column as a price per square metre of the gross floor area.

Where appropriate, each Element should also be expressed with an elemental quantity, a ratio and an elemental unit price. Furthermore, an itemized Elemental Cost Summary should accompany the Elemental Cost Analysis, together with copies of plans and elevations. When there is more than one building on a single site, separate element costs analyses should be prepared for each building and for the site work (e.g., landscaping, entrance roads) with general requirements and fees (e.g., supervision and labour expenses, permits, insurance and bonds) and allowances (e.g., design, escalation and construction) proportioned between them.[6]

Table 3 illustrates an Elemental Cost Analysis for an accommodation project (e.g., Public Administration Buildings). Starting from Level 1, the largest Element grouping, Major Group Elements such as the shell, interiors, and services are identified. Level 2 subdivides Level 1 Elements into Group Elements. The shell, for example, includes the superstructure, structure, and exterior closure. Level 3 breaks the Group Elements further into Individual Elements. Exterior closure, for example, includes walls below grade, walls above grade, windows and entrances, roof covering, and projections. For illustrative purposes, a cost breakdown column was not included.

[6] Association for the Advancement of Cost Engineering (2011) - AACE International Recommended Practice No. 18R-97: Cost Estimate Classification System – As Applied In Engineering, Procurement, And Construction For The Process Industries.

Table 3: Elemental Cost Analysis - Accommodation Project

LEVEL 1 Major Group Elements	LEVEL 2 Group Elements	LEVEL 3 Individual Elements
A Shell	A1 Substructure	A11 Foundation A12 Basement Excavation
	A2 Structure	A21 Lowest Floor Construction A22 Upper Floor Construction A23 Roof Construction
	A3 Exterior Enclosure	A31 Walls Below Grade A32 Walls Above Grade A33 Windows and Entrances A34 Roof Covering A35 Projections
B Interiors	B1 Partitions and Doors	B11 Partitions B12 Doors
	B2 Finishes	B21 Floor Finishes B22 Ceiling Finishes B23 Wall Finishes
	B3 Fittings and Equipment	B31 Fittings and Fixtures B32 Equipment B33 Conveying Systems
C Services	C1 Mechanical	C11 Plumbing and Drainage C12 Fire Protection C13 H.V.A.C C14 Controls
NET BUILDING COSTS (Excluding Site)		
D Site and Ancillary Work	D1 Site Work	D11 Site Development D12 Mechanical Site Services D13 Electrical Site Services
	D2 Ancillary Work	D21 Demolition D22 Alterations
NET BUILDING COSTS (Including Site)		
Z General Requirements and Allowances	Z1 General Requirement and Fee	Z11 General Requirements Z12 Fee
TOTAL CONSTRUCTION ESTIMATE (Excluding Allowances)		
	Z2 Allowances	Z21 Design Allowance Z22 Escalation Allowance Z23 Construction Allowance
TOTAL CONSTRUCTION ESTIMATE (Including Allowance)		

The following is an expanded list of items that are generally found in each Element. These items should be measured under the same Element to ensure consistency from one Cost Plan to the other.

A) Shell:

1. Substructure – includes foundation systems, basement excavation, shoring system, dewatering.
2. Structure – includes slab on grade, granular sub-base, upper floor framing, roof framing.
3. Exterior – includes the building envelope such as curtain wall, solid wall system and assembly (brick, metal, etc.), windows, roof membrane, canopy, parapets.

B) Interiors:

1. Partitions and doors – includes elevator and stair core walls, block wall, drywall partition, hollow metal doors, solid core doors, door frames and hardware.
2. Finishes – includes floor, wall and ceiling finishes.
3. Fittings and equipment – includes fixed millwork, washroom accessories, handrails, guardrails, equipment (approved and agreed with Project Sponsor outside of the FFE list).

C) Services:

1. Mechanical – includes plumbing, fire protection and sprinkler, HVAC, building controls.
2. Electrical – includes Service Distribution, Lighting, Power Systems and Ancillaries, Fire Alarm, Security and IT systems.

D) Site and Ancillary Work:

1. Site work – includes soft and hard landscaping, exterior lighting, incoming hydro service, storm service, sewer service, natural gas service.
2. Ancillary work – includes demolition, renovation works.

E) General Requirements:

General conditions and fees – includes General Contractor's overheard and profit, site supervision cost, temporary service, hoarding, temporary accommodation/office.

3.5 Allowances

In **Table 3**, the example of an Elemental Cost Analysis, the total construction estimate excluding allowances, represents the base estimate. It is common practice to add allowances, otherwise known as contingencies, to the base estimate. A contingency can be defined as a financial provision to absorb the impacts of cost escalating events that are likely to occur, but for which costs cannot be estimated with a high degree of certainty at the time of the capital investment budget establishment. Contingencies are typically related to imprecision in quantities, depending on the level of advancement of the detailed design, and the variation of unitary prices due to events that may be difficult to quantify with a high degree of certainty (e.g., volume of soil to be decontaminated).

Within the Elemental Cost Analysis, the Cost Consultant should determine the appropriate contingencies for different elements. The different elemental contingencies will reflect the different levels of uncertainty associated with the respective elements. The contingencies are included in the primary budget. Schematic estimates typically contain contingencies or allowances to deal with uncertainty in three different project areas:

1. Design and Estimating Allowances are added to reflect the early state of the project design. The contingencies are to cover omissions and unknown project elements resulting that can be expected to be discovered over the design process.
2. Escalation Allowances are added to allow for unexpected changes in sub-contractor and input prices between the time of the initial estimate and when the work is ultimately performed. In capital projects, local market conditions can often give rise to short-term labour, material and equipment shortages resulting in spikes in construction prices.
3. Construction Allowances are added to address potential cost increases that can occur during the construction stage. These allowances are built in to absorb cost overruns and project delays. They will also cover unexpected damage to the project, site or adjacent areas.

When developing the cost estimates for the asset, the Cost Consultant separately identifies the contingencies from base costs, in parallel with risk quantification to help ensure there is no double counting between cost contingencies and risk quantification. It is recommended that the scope of the Cost Consultant's engagement include participation in the risk workshop(s). Contingencies should be built into the Project Sponsor's primary budget with the expectation to be fully spent during the capital investment.

When Proponents prepare bid prices, they will typically include a risk provision (also sometimes called owner's reserve), which will vary depending on the delivery method and risk allocation approach. The risk provision is typically left outside of the primary budget.

4 SECTOR-SPECIFIC CONSIDERATIONS

In Sections 2 and 3 of this Guide, the general requirements applicable to an accommodation project were provided. Though different classes of infrastructure will have many features in common, there are notable differences in the types of background information, design representations, reports and technical reports across sectors. The breakdown of assets into Elements will vary depending on the class of infrastructure which will impact the output of the Cost Estimate. The following section will examine sector-specific considerations; it is recommended that Project Sponsors seek advice from Technical Advisors and Cost Consultants for the appropriate inputs for cost estimates and Cost Report formatting.

Table 4 summarizes the general differences in available information for projects in different infrastructure classes that serve as the basis for the cost estimate.

Table 4: Available Information in Different Infrastructure Assets

Item	Source	Document	ASSET CLASS					
			Light/ Heavy Rail	Bridges/ Highways	Water Treatment Facilities	Wastewater Treatment Facilities	Maintenance Facilities – Trains	District Energy
Schematic floors plans including basic statistics (i.e., gross floor area, number of floors, number of parking spaces, etc.)	Architect	Drawing/ Outline Brief	X		X	X	X	
As-built drawings for existing building (if applicable)	Project Sponsor	Drawing		X	X	X		
Demolition drawings (if renovation), including clear indication of existing materials to remain	Architect	Drawing	X	X	X	X	X	X
Preliminary Structural foundation system and typical framing plan	Structural Engineer	Drawing		X	X	X	X	X
Preliminary Exterior wall elevations	Architect	Drawing		X	X	X	X	X

Different infrastructure classes will have specific information requirements. A Cost Consultant is required to have this information at the time of Schematic Design Estimate preparation. These items could have significant cost impact and are considered cost drivers for the project. The following list summarizes suggested requirements for various infrastructure classes:

1. **Light Rail/Heavy Rail**
   - System requirements
   - Vehicle specifications
   - Signalization requirements
   - Station design information (i.e. plan layout, structural, mechanical and electrical brief)
   - Guideway information (i.e. structure, etc.)
   - Electrical systems information: overhead contact systems; supply; and, substations and distribution
   - Fare equipment requirements
   - Vertical movement requirements/accessibility
   - Signage and way finding requirements
   - Special structures (i.e. bridges, viaducts, etc.)
   - Grading requirements
   - Track layout and assembly
   - Services/ utilities brief and utilities diversion (if required)

2. **District Energy (Steam Generating Facility, etc.)**
   - Boiler and steam generator sizes and product specification.
   - Schematic diagrams
   - Design brief
   - Floor plan including equipment layout

3. **Maintenance Facilities – Train**
   - Preliminary layout plan
   - Block and stacking diagram
   - Facility capacity
   - Lift equipment requirements (i.e. cranes, etc.)
   - Maintenance requirements
   - Drive through bus washing system requirements
   - Body work and paint booths
   - Waste disposal requirements
   - Storage/shelving requirements
   - Fuel equipment requirement

- Track lay-out and assembly
- Special trackwork
- Special structures (i.e. pits, etc.)

4. Maintenance Facilities - Bus

- Preliminary layout plan
- Block and stacking diagram
- Facility capacity (number of buses)
- Lift equipment requirements (i.e. cranes, etc.)
- Maintenance equipment requirements
- Body work and paint booths
- Bus washing system requirements
- Waste disposal requirements
- Storage/shelving requirements
- Fuel equipment requirement
- Special structures (i.e. pits, etc.)

5. Water Treatment Facilities

- System description report
- Process, instrumentation and wiring program
- Floor plans including equipment layout
- Process equipment sizes
- Design brief

6. Wastewater Treatment Facilities

- Water testing structure capacity
- Leachate tank and storage tank size and capacity
- Aeration channel size/dimension
- Filter building plan/dimension
- UV disinfection requirements
- Travelling bridge filter requirements
- Instrumentation requirements (i.e. programming)
- Electrical requirements (i.e. service and distribution, emergency power, etc.)

7. Bridges/Highways

- Traffic information and forecasts
- Bridge load and substructure requirements
- Drainage

- Bridge Span
- Bridge – Dual or single structure
- Earthworks/cut & fill/grading plan
- Retaining wall layout
- Ramp requirements
- Sub-base requirement
- Asphalt/paving specification
- Preliminary road and bridge layout

8. **Accommodations**

(a) Detention Centres

- Number of cells
- Security requirements – Interior and exterior
- Block stacking diagram
- Preliminary layout plan
- Communication/IT requirements

(b) Offices

- Number of parking space – Above and/or below grade
- Block stacking diagram
- Preliminary layout plan
- Floor to floor heights
- Preliminary elevation drawings
- Security and communication/IT requirements

Even with this additional information, it may not always be possible to achieve a desired level of accuracy (+/- 15%), typically reached with a 30% design. For example, in water and wastewater treatment plants, the design may have to be further advanced for some components in order to have a clearer understanding of the special process and functional inter-relationships. As well, certain elements, such as major equipment requirements, may need to be well-specified in order to obtain accurate pricing on the plant. To incorporate the unique features of different classes of infrastructure, it will also be necessary to adapt the elemental model to provide categories that are meaningful to the project. In the following UNIFORMAT II bridge classification table, the Elemental Cost Analysis has been revised to reflect the differences between an accommodation facility and a bridge.

Table 5 divides the classification of bridge elements into three hierarchical levels: Level 1, Major Group Elements; Level 2, Group Elements; and Level 3, Individual Elements. The major groups are listed in normal chronological order of construction.

Table 5: Proposed UNIFORMAT II Classification of Bridge Elements[7]

LEVEL 1 Major Group Elements	LEVEL 2 Group Elements	LEVEL 3 Individual Elements
A Substructure	A10 Piers	A1010 Foundations A1020 Walls A1030 Columns A1040 Cap Beams
	A20 Towers	A2010 Foundations A2020 Walls A2030 Columns A2040 Cap Beams
	A30 Abutments	A3010 Foundations A3020 Stems A3030 Wing Walls
	A40 Other Supports	A4010 Thrust Blocks A4020 Anchorages
B Superstructure	B10 Short Span Assemblies	B1010 Flexural Members B1020 Diaphragms B1030 Bracings B1040 Bearings
	B20 Long Span Assemblies	B2010 Ribs B2020 Cables B2030 Hangers B2040 Spandrels B2050 Ties B2060 Truss Members B2070 Segmental Box Girders
	B30 Deck	B3010 Structural Surface B3020 Wearing Surface
C Protection	C10 Structure Protection	C1010 Slope Walls C1020 Expansion Joints C1030 Protective Coats C1040 Sacrificial Beams C1050 Drainage Systems C1060 Inspection and Maintenance Systems
	C20 Traffic Protection	C2010 Barriers C2020 Protective Shields C2030 Traffic Controls
	C30 Other Protection	C3010 Lighting C3020 Signage C3030 Sound Barrier Walls C3040 Air Pressure Barriers C3050 Enclosure

[7] Kasi, Muthiah and Robert E. Chapman (2011), "Proposed UNIFORMAT II Classification of Bridge Elements", U. S. Department of Commerce National Institute of Standards and Technology.

LEVEL 1 Major Group Elements	LEVEL 2 Group Elements	LEVEL 3 Individual Elements
D Site Work	D10 Site Preparation	D1010 Clearing and Grubbing D1020 Demolition and Relocation D1030 Earthwork D1040 Hazardous Material Handling D1050 Environmental Restoration /Replacement
	D20 Approach Construction	D2010 Approach Slabs D2020 Sleeper Slabs D2030 Earth Retention Systems

The Canadian Institute of Quantity Surveyors (CIQS) standard is well suited to Canadian accommodations projects and may be less suited to some infrastructure classes. In these cases, Cost Consultants may wish to use an alternate format for the cost estimate, such as Master Format or UNIFORMAT II. Though different in form, alternative formats should allow for the same level and detail of analysis.

5 OUTPUT / DELIVERABLES

5.1 Overall Project Budget

The Schematic Design Cost Estimate approach results in the preparation of a construction cost estimate in the Elemental Format. Traditionally, construction costs are the most significant cost factor of a project. In P3s, the Project Sponsor is concerned with both the capital (construction) costs as well as the total costs over the asset's lifecycle. When several design approaches are being considered, the Cost Consultant will typically assess the operations and maintenance requirements of the asset, as well as major maintenance activities over the lifecycle in order to prepare whole-of-life project costs.

The operation and maintenance costs may be estimated in conjunction with the Project Sponsor. Often, the Sponsor will provide operational cost data drawn from current facilities. In more complex projects, or in cases where there is no available data on similar facilities, the Project Sponsor may obtain the services of a Facilities Management Advisor to provide more detailed information on operations and maintenance costs.

In some cases, projects may have unique inputs that will have a significant impact on operational costs. For example, a district energy system will be energy intensive. In these cases, it may be worthwhile to undertake specialized investigations to better understand requirements over the life of the project. This will allow for a better forecast of project operational costs.

Similarly, the Cost Consultant will typically work with the designer and technical staff to understand the lifespan of the infrastructure and the maintenance requirements. The maintenance cycles and activities will be used to develop an estimated program for major maintenance.

As well, the Cost Consultant will work with the Project Sponsor and the Technical and Financial Advisors to develop estimates for other relevant project costs.

Table 6 provides a list of inputs which are also useful or required to prepare the overall project budget:

Table 6: Inputs

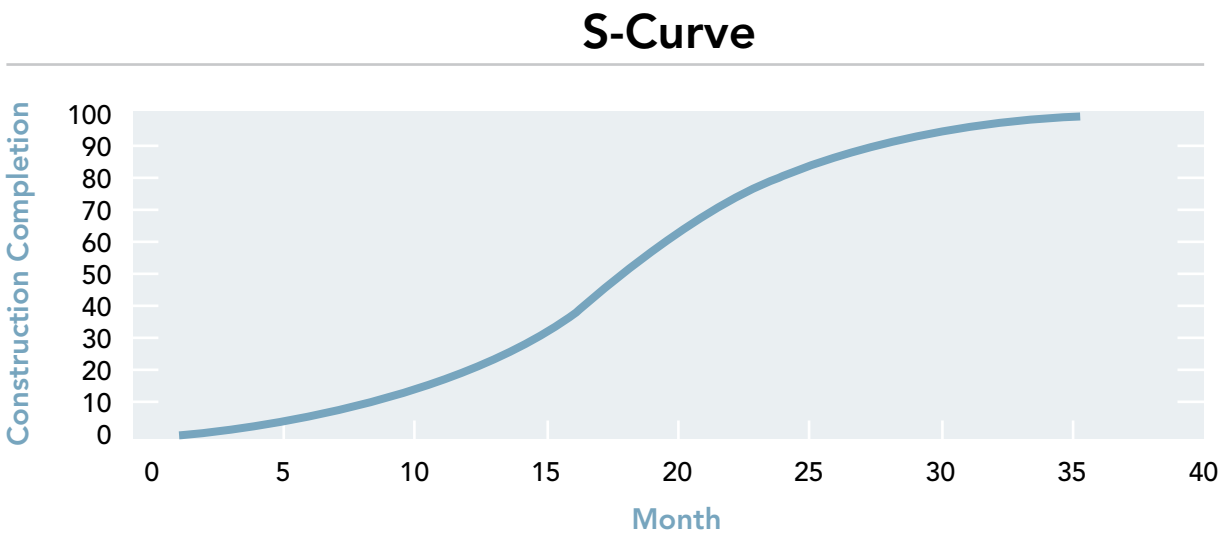
ITEM	SOURCE
Risk recommendations (Design, inflation, market conditions, etc.)	Cost Consultant
Furniture, finishings and equipment	Cost Consultant/Consultant
Ancillary costs (Planning, design compliance (PDC)) Fees, permits, development changes, insurances, etc.	Cost Consultant Project Sponsor
Land cost	Project Sponsor
HST/GST	Cost Consultant
Moving/relocation cost	Moving Consultant
Financing cost	Financial Advisor
Testing and inspection	Architect
ITEM	**SOURCE**
Transaction advisor cost	Financial Advisor
Design bid fees	Project Sponsor
Facilities operational cost	Facility Management Advisor
Maintenance and lifecycle cost	Technical Advisor

5.2 Construction S-Curve

To assist the Project Sponsor, the Cost Consultant will provide an expected construction cash flow in the form of an S-Curve. The S-Curve indicates estimated cumulative construction expenditures as a percentage of total construction costs over the construction schedule. This S-Curve is used to distribute construction costs in real terms across the construction period.

The shape of the curve is the result of costs being incurred at a lower rate for equipment mobilization and site preparation then ramping up for the major works and tapering off again as testing and commissioning takes place. A robust and substantiated S-Curve from a Cost Consultant demonstrates that thought has been given to the construction program. The real-valued S-Curve will allow for costs to be cost estimates escalated to the projected construction start date. **Figure 1** illustrates a typical expenditure curve for a construction project.

Figure 1: Construction S-Curve



5.3 Cost Report

Once the cost estimate has been completed and the Cost Consultant has worked with the Project Sponsor to identify and estimate other costs contributing to the total project budget, the Cost Consultant should prepare a Cost Report. This document provides a summary of the following: the methodology for the estimate; construction phasing; the cost considerations (basis for escalation, inflation, market volatility and contingency calculations); a description of all supporting documents referred to; and, a listing of all cost components bearing significant risk. The Cost Report includes the Elemental Cost Analysis, the total cost of each cost component and the cost per square metre of building gross floor areas (as defined for the specific building types).

A typical Cost Report includes the following:

- **Executive Summary**
- **Background**
  - Project background
  - Project objectives
  - Project scope
- **Design Considerations**
  - Site context
  - Program spaces
  - Functional, construction and operational requirements
  - Structural, mechanical, electrical and landscape requirements
  - Architectural styles

- Type of construction, materials and finishes
- Building code review
- Sustainability

- **Methodology**
  - Basis of estimate
  - Method of preparation
  - Major quantities or length
  - Major assumptions
  - Cost basis
  - Inclusion/exclusions
- **Cost Summary**
  - Summary project budget
  - Elemental Cost Estimate
  - Operations & Maintenance estimates
  - Planning and implementation costs
  - Summary of areas
  - Building statistics
  - Project/construction schedule
  - S-Curve
  - Unit costs and cost base
  - Commentary on economic and market forces
- **List of Documents**
  - Functional plans
  - Scoping documents
  - Feasibility studies
  - Planning/technical documents
  - Previous cost estimates
- **Figures and Drawings**
  - Site plan
  - Floor plan
  - Elevations
  - Perspectives

As the project is developed, the Project Sponsor will prepare and update the project budget. By the time the Schematic Design Cost Estimate is prepared, the Project Sponsor has prepared a rough order-of-magnitude estimate as well as an estimate for the Conceptual Design. In these cases, the Cost Consultant should include a section on budget variances in the Cost Report. The Cost Consultant should also reconcile differences between current estimates and previous budget estimates. Specifically, the budget variance report should distinguish between changes that are due to changing quantities (i.e. building floor areas), to price changes or to changing project requirements/specifications.

6 CONCLUSION

One of the most significant challenges for a Project Sponsor is to successfully deliver on all aspects of an infrastructure project relative to output specifications and budget constraints. The ability to control whole-of-life costs requires the development of detailed cost estimates. Following established guidelines, learning from precedent projects and reacting effectively to changes in project needs is essential to delivering the project on-time and on-budget.

The accuracy of cost estimates is clearly a critical factor in P3 projects, where little design work is undertaken in order to encourage design innovation and avoid replicating work effort with Proponents. Accordingly, the need for accurate cost estimates is arguably greater in P3s than in traditional design-bid-build models.

For P3 projects, this Guide recommends a Cost Analysis with an accuracy of +/- 15% which is generally supported by a Schematic Design at a 30% level. The Schematic Design Estimate focuses the capital costs of the project during the construction phase. This approach allows for the development of robust cost estimates for decision-making, while minimizing any potential to impede private sector innovation and duplicate efforts in a P3. It is generally an accepted industry standard that a Schematic Design Estimate is prepared in Elemental Format, which is approved by the Canadian Institute of Quantity Surveyor. However, developing a Schematic Design Estimate varies based on the type of infrastructure being constructed. Although different classes of infrastructure will have many common features there will be departure points, therefore, the required background information, elemental categories, and final outputs will be different among infrastructure classes.

To incorporate the unique features of different classes of infrastructure, the Project Sponsor can adapt an alternate format for the cost estimate such as Master Format or UNIFORMAT II. Though different in form, alternative formats allow of the same level and detail of analysis.

The cost of preparing a Schematic Design Estimate can range from 1.5% to 5% of the overall project costs. However, the greater reliability attained in the preparation of a Schematic Design Estimate benefit the Sponsor. Securing a sufficient project budget and having the ability to benchmark costs against publicly verifiable construction databases for comparisons of results across projects over time are significant advantages related to the design estimate approach.

Utilizing the industry best practices recommended in this Guide in conjunction with the support of Cost Consultants and Technical Advisors, Project Sponsors have the ability to successfully deliver on all aspects of an infrastructure.

ANNEX A: GLOSSARY

Association for the Advancement of Cost Engineering (AACE)	AACE International is a non-profit professional association. AACE International serves total cost management professionals in disciplines such as: cost engineering, cost estimating, planning and scheduling, decision and risk management, project management, project control, cost/schedule control, earned value management, claims, and more. AACE International has members in 87 countries and cover 80 local sections.
Base Cost Estimate	An evolving estimate of known factors without any allowances for risk and uncertainty, or Element of Inflation. The Base Cost Estimate is the sum of the Works Cost Estimate, the project/Design Team fees estimate and the Other Development/ Project Costs estimate.
Building Work (or Building Works)	All components measured and incorporated in Group Elements (i.e. substructure; superstructure; Internal finishes; fittings, furnishings and equipment; services; complete buildings and building units; work to existing buildings; external works).
Building Works Estimate	The sum of the Cost Targets for Group Elements 1 to 9 (i.e. substructure; superstructure; internal finishes; fittings, furnishings and equipment; services; complete buildings and building units; work to existing buildings; external works; and facilitating works). It eludes main contractor's preliminaries and main contractor's overheads and profit.
Canadian Institute of Quantity Surveyors (CIQS)	The Canadian Institute of Quantity Surveyors (CIQS) is a self-regulatory, professional body that sets the highest standard for construction economics in Canada.
Capital Variance Report	Is a report reconciling the current estimate versus Project Sponsor's budget which identifies variations in capital costs, resulting from changes in the input factors (e.g., building).
Client	The person or organization who engages the professional advice or services of another.
Component	A measured item which forms part of an Element or Sub-element. The quantity of one or more items will be measured and the cost estimated to ascertain the Cost Target for an Element or a Sub-element.
Conceptual Design	Following the Project Initiation, the Sponsor refines requirements for the asset and begins to consider options for the development of the project.
Construction Inflation	An allowance included in the order of cost estimate (OCE) or elemental plan for fluctuations in the basic prices of labour, plant and equipment, and materials during the period from the date of tender return to the mid-point of the construction period. See also the definition for Tender Inflation.
Cost Checks (Cost Check or Cost Checking)	Take place during all design stages and are concerned with comparing current estimated costs against Cost Targets previously set for Elements or Sub-elements of the building. This entails an ongoing advisory role during each design stage.
Cost Consultant	A professional who, by training and experience, provides expert advice on construction costs as well as operations and maintenance.

Cost Control	The process of planning and controlling the costs of building(s). Takes place throughout complete duration of the construction project.
Cost Limit (or Authorized budget or Approved Estimate)	The maximum expenditure that the Project Sponsor is prepared to make in relation to the completed building.
Cost per Functional Unit (or Functional Unit Cost)	The Unit Rate which, when multiplied by the number of functional units, gives the total Building Works Estimate (i.e. Works Cost Estimate less Main Contractor's preliminaries and Main Contractor's overheads and profit). The total recommended Cost Limit (i.e. Cost Limit, including Inflation) can also be expressed as a Cost per Functional Unit when reporting costs.
Cost Report	This document provides a summary of the following: the methodology for the estimate; construction phasing; cost considerations (basis for escalation, Inflation, market volatility and contingency calculations); a description of all supporting documents referred to; and a listing of all cost Components bearing significant risk. The Cost Report includes the Elemental Cost Analysis, the total cost of each cost component and the cost per square meter of building gross floor areas (as defined for the specific building types).
Cost Target	The recommended total expenditure for an Element. The Cost Target for each Element is likely to be derived from a number of Sub-elements and Components.
Design Team	Architects, engineers and technology specialist responsible for the Conceptual Design aspects and the development into drawings, specifications and instructions required for construction of the building or facility and associated processes. The design team is a part of the project team.
Element	Elements are major components common to most buildings. Elements usually perform a given function, regardless of the design specification, construction method, or materials used. A separate cost target can be established for each Element.
Element Unit Quantity	A unit of measurement which relates solely to the quantity of the Element or sub-element itself (e.g. the area of the external walls, the area of windows and external doors and the number of internal doors).
Element Unit Rate (EUR)	The total cost of an Element divided by the Element Unit Quantity (EUQ), equates to a "composite Unit Rate". For example, the Element Unit Rate for external walls is the total cost of the external walls divided by EUQ for external walls. It includes all the cost of all materials, labour; plant, Subcontractor's preliminaries, Subcontractor's design fees and Subcontractor's overheads and profit/margins. EURs exclude Main Contractor's preliminaries, Main Contractor's overheads and profit and other allowances, such as project/Design Team fees, Other Development/Project Costs, Risk Allowances and Inflation. These items are to be assessed separately.
Elemental Cost Analysis/ Cost Analysis	Elemental Cost Analysis is a system of Cost Planning and control for buildings and structures which helps monitor and control project costs during design development. This analysis computes the total cost of each cost component and the cost per square metre of building gross floor areas (as defined for the specific building types).

Elemental Cost Plan (or Cost Plan)	The critical breakdown of the Cost Limit for the building(s) into Cost Targets for each Element of the building(s). It provides a statement of how the Design Team proposes to distribute the available budget among the Elements of the building, and a frame of reference from which to develop the design and maintain Cost Control. It also provides both a work breakdown structure (WBS) and a cost breakdown structure (CBS) which, by codifying, can be used to redistribute work in Elements to construction works packages for the purpose of procurement.
Elemental Cost Summary	Provides for a common point of agreement on costs for all project stakeholders in a way that is concise, consistent, easily understood, and adapted to elemental cost analysis.
Elemental Format	A comprehensive method of cost analysis for use in cost planning and budget control.
Elemental Method	A budget setting technique which considers the major Elements of a building and provides an order of cost estimate based on an Elemental Cost Analysis of a building project. The Elemental Method can also be used to develop an initial cost model as a prerequisite to developing an Elemental Cost Plan.
Estimate Base Date	The date on which the Cost Limit (excluding inflation – i.e. the sum of the Works Cost Estimate, project/Design Team fees estimate, Other Development/ Project Costs estimate and Risk Allowance estimate) is established as a basis for calculating inflation, changes or other related variances.
Facility Management Advisor	Provides facility management advice for a transaction.
Financial Advisor	Provides financial advice for a transaction.
Functional Areas Estimate Summary	A report summarizing capital costs based on departmental gross floor areas.
Functional Plan	Developed at the Conceptual Design Stage, the Functional Plan specifies the technical requirements of the Project Sponsor. Such technical requirements may include specifying the floor layout, the type of equipment, and technology that will be used in the asset.
Group Elements	A main heading used to describe the facets of an Elemental Cost Analysis. Group Elements are a subset of Major Group Elements. The Shell, for example, includes the superstructure, exterior closure, and roofing.
Individual Elements	A main heading used to describe the facets of an Elemental Cost Analysis. Individual Elements breakdown Group Elements further; exterior closure, for example, includes exterior walls, exterior windows, and exterior doors.
Industry Professionals	Individuals or a group of Individual Professionals who are engaged in a certain activity and have expertise and specialized knowledge in field which one is practicing professionally
Inflation	An allowance included in the order of cost estimate or Cost Plan for fluctuations in the basic prices of labour, plant and equipment and materials. Refer to definitions for Tender Inflation and Construction Inflation.

Key Indicators Report	A report outlining key statistics on the project such as gross floor area, overall Site Area, total length of rail/track etc.
Main Contractor (or Prime Contractor)	The contractor responsible for the total construction and completion process of the building project. The term prime contractor is often used to mean Main Contractor in central civil government and the defense sector.
Main Contractor's Overheads and Profit	The Main Contractor's costs associated with head office administration proportioned to each building contract plus the Main Contractor's return on capital investment. Main Contractor's preliminaries exclude costs associated with Subcontractors overheads and profit, which are to be included in the Unit Rates applied to building works.
Main Contractor's General Conditions	Items which cannot be allocated to a specific Element, Sub-element or Component. Main Contractor's preliminaries include the Main Contractor's costs associated with management and staff, site establishment, temporary services, security, safety and environmental protection, control and protection, common user mechanical plant, common user temporary works, the maintenance of site records, completion and post-completion requirements, cleaning, fees and charges, sites services and insurances, bonds, guarantees and warranties. Main Contractor's preliminaries exclude costs associated with Subcontractor's Preliminaries, which are to be included in the Unit Rates applied to building works.
Major Group Elements	A main heading used to describe the facets of an Elemental Cost Analysis. Major Group Elements include: Shell, Interiors, Services, Site & Ancillary Work, and General Requirements and Allowances.
Master Format	Master Format is a standard for organizing specifications and other written information for commercial and institutional building projects in the U.S. and Canada. Master Format is a product of the Construction Specifications Institute (CSI) and Construction Specifications Canada. It provides a master list of divisions, and section numbers and titles within each division, to follow in organizing information about a facility's construction requirements and associated activities
Moving Consultant	Provides advice and/or assistance with moves.
Other Development Project Costs	Costs that are not necessarily directly associated with the cost of constructing the building, but form part of the total cost of the building project to the employer (e.g. land acquisition costs, marketing costs, etc.
Professional Association	A professional association is an organization seeking to further a particular profession, the interests of individuals engaged in that profession, and the public interest.
Project Cost Plan	Addresses the cost of the resources needed to complete the project.
Project Initiation	The point at which the Project Sponsor identifies the need for the asset and outlines the initial scope of the project.
Project Sponsor / Sponsor	One who has the legal right or title to a project or asset.
Proponent	A bidder in a procurement process.

Public-Private Partnership (P3)	A long-term contractual relationship between a Project Sponsor and the private sector that involves: the provision of capital assets and associated services to meet a defined output specification (i.e., define what is required rather than how it is to be done); the integration of multiple project phases (e.g., design, build, finance, operate and maintain); the transfer of risk to the private sector anchored with private sector capital at risk; and the performance-based payment mechanism.
Risk Allowance	The amount added to the Base Cost Estimate for items that cannot be precisely predicted to arrive at the Cost Limit.
Risk Transfer	Risk exists in all projects, irrespective of the procurement approach. In a P3, risks are transferred to the party that can best manage them, thereby reducing financial uncertainty for public sector.
Risk Workshop	An event in which the project team and relevant specialists are asked to identify, quantify (impact and probability) and allocate risks that could affect the various stages of a project (planning, construction, operations, lifecycle).
S-Curve	The S-curve shows graphically the cumulative progress of a construction project over the project duration
Schematic Design	The Schematic Design, prepared by architects and engineers, considers the overall design of the build with production of preliminary sketch drawings and an outline specification.
Schematic Design Estimate	An estimate between the what is referred to as a Class D and Class C estimate which is at the higher end of the range and provides a more specific, more accurate cost figure while focusing on the use of the output requirement of +/- 15% level of accuracy. The purpose this estimate level is to provide a more comprehensive cost estimate and will be typically based on a better definition of the scope of work. An estimate at this level may be used to price various design schemes in order to see which scheme best fits the budget, or it may be used to price various design alternatives, or construction materials and methods for comparison.
Site Area	The total area of the site within the site title boundaries (or the total area within the site title boundaries defined by the employer as the site for the building), measured on a horizontal plane, excluding the area of the building footprint. Excludes any areas used temporarily for the building works that do not form part of the delivered building project.
Subcontractor	A contractor who undertakes specific work within the building project; known as specialist, works, trade, work package, and labour only Subcontractors.
Subcontractor's Preliminaries	Preliminaries that relate specifically to Building Work which is to be carried out by a Subcontractor. Costs associated with Subcontractor's preliminaries are to be included in the Unit Rates applied to Sub-elements and individual components.
Sub-element	A part of an Element. Similar to Elements, a separate Cost Target can be established for each Sub-element.
Technical Advisor	Provides advice on such items including: design and construction, performance specifications, and asset hand-back requirements.

Tender Inflation	An allowance included in the order of cost estimate or Cost Plan for fluctuations in the basic prices of labour, plant and equipment and materials during the period from the Estimate Base Date to the date of tender return. See also the definition for construction Inflation.
Total Development Cost	The Cost Limit (including Inflation – i.e. the total of the Works Cost Estimate, the project/Design Team fees estimate, Other Development/Project Costs estimates, Tender Inflation and construction Inflation) for the building project.
The Total Project Costs Report	A report that includes the total cost of each cost Component and the cost per square foot of building gross floor area (as defined for the specific building type).
Transaction Advisor	Provides advice on a transaction.
UNIFORMAT II / UniFormat	UniFormat is a standard for classifying building specifications, cost estimating, and cost analysis in the U.S. and Canada. The elements are major components common to most buildings. The system can be used to provide consistency in the economic evaluation of building projects. It was developed through an industry and government consensus and has been widely accepted as an American Society for Testing and Materials (ASTM) standard. In 1989, ASTM International began developing a standard for classifying building elements, based on the UNIFORMAT. It was renamed to UNIFORMAT II.
Unit Rate(s)	The monetary rate applied to an Element, Sub-element or component per unit of measurement (e.g. cost per m, cost per m^2 and cost per m^3).The term also includes costs/m^2 of GFA and Cost per Functional Unit (or Functional Unit Cost).
Value for Money (VfM)	Value for Money (VfM) is the comparison between the total project costs (capital base costs, financing costs, retained risks and ancillary costs), at the same point in time, for a traditionally procured project (known as the public sector comparator or PSC) and delivery of the same project using the P3 model (known as the shadow bid). The incremental difference between the public sector comparator and the shadow bid is referred to as the VfM. There is said to be a positive VfM for procuring a project using a P3 approach when the Shadow Bid is less than the public sector comparator.
Works Cost Estimate	The combined total estimated cost of the building works estimate, the Main Contractor's preliminaries and the Main Contractor's overheads and profit prepared using prices current at the time the estimate is prepared (or updated). The Works Cost Estimate contains no allowance for project/Design Team fees, Other Development/Project Costs, Risk Allowances, Tender Inflation and construction Inflation.

NOTES


MPROVING THE DELIVE
NFRASTRUCTURE T
UBLIC-PRIVATE PAR
UTILISER LES PARTENA
PUBLIC-PRIVÉ AFIN D'AM
MISE EN PLACE D'INFRAS
PUBLIQUE