



**ACEC**  
BRITISH COLUMBIA



# **ACEC British Columbia**

## **Budget Guidelines for Engineering Services Document 2 – Buildings**

November 2022

[acec-bc.ca](http://acec-bc.ca)

## **ACKNOWLEDGMENT**

This document was produced with contributions from Engineers and Geoscientists BC. ACEC-BC thanks Engineers and Geoscientists BC for their support in ensuring information contained within accurately represents Engineers and Geoscientists BC's governing legislation, Bylaws, and Code of Ethics.

### **Version 2, November 2022**

This document is part of a series of documents on *Budget Guidelines for Engineering Services*. Version 1 replaced the Building Engineering Services component of *Budget Guidelines for Consulting Engineering Services – 2009*; Version 2 provides an update including alignment with changes in professional regulation.

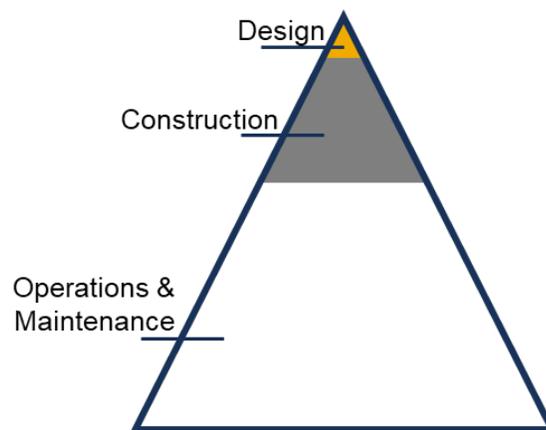
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## FOREWORD

The success of any project depends upon obtaining the most suitable engineering expertise. Selection of the most qualified firm for a specific project will result in a well-planned and designed, economical and successful project. Selecting a consulting engineer, therefore, is one of the most important decisions a client makes. Over the lifecycle of a typical building project, design represents the smallest fraction of the total cost, although it can have the most significant impact on overall project efficiency and long-term operating and maintenance costs.

### Project Lifecycle Costs – from start to end



**The Consulting Engineer** is a Professional Engineer in private practice who offers services to the public and private sectors.

Since 1976, the **Association of Consulting Engineering Companies British Columbia** (ACEC-BC) has been the voice of consulting engineering companies in BC. Our purpose is to advance the business of consulting engineering firms in BC. We do this by advocating for fair business practices, raising awareness of the industry's contributions to society, and the industry's innovative technical expertise.

Engineers and Geoscientists British Columbia is the business name of the Association of Professional Engineers and Geoscientists of the Province of British Columbia. They regulate and govern engineering and geoscience under the authority of the *Professional Governance Act* and are charged with protecting the public interest by setting and maintaining high academic, experience, and professional practice standards for registrants. Only individuals and firms licensed by Engineers and Geoscientists BC are permitted by law to undertake and assume responsibility for engineering and geoscience projects in BC.

## **PART A: BASIS FOR REMUNERATION**

### **1.0 PURPOSE OF THIS DOCUMENT**

This document provides guidelines for establishing consulting engineering fees for building projects in British Columbia. The document is created by building engineering design professionals for the purpose of providing information to support development of project budgets based on normally appropriate fees for services by qualified professionals. The guideline considers:

- The professional work required to meet necessary standards of engineering care and quality.
- The professional's obligations under the *Professional Governance Act* and associated Engineers and Geoscientists BC Bylaws.
- Continuing education and skills training required to support maintenance of professional qualification.

The fees identified in this document reflect the level of service professional engineers must provide to meet the standard of practice identified in Engineers and Geoscientists BC practice guidelines and advisories<sup>1</sup>. For reference, guidelines and advisories identify the level of effort, responsibilities, professional activities, and due diligence a registrant must provide to fulfil their professional obligations under the *Professional Governance Act*, Engineers and Geoscientists BC Bylaws, and Code of Ethics.

Use of this document will support development of project budgets that support appropriate and value-added engineering services. Providing long-term value for project stakeholders is achieved only through proper planning and engineering work performed during the entire project lifecycle. Decisions made in planning and design not only determine whether the project delivers the intended service and satisfies the original need but will also directly affect the entire service life – and overall lifecycle cost – of the project. Reducing investment at the design stage can result in significantly higher capital, operating, and maintenance costs through the life of the building.

The document is intended to support the practice of all engineering professionals providing consulting engineering services, and to support understanding of building project budgets by owners, constructors, and other stakeholders. The guideline focusses on *core consulting services*, including structural, mechanical, and electrical design. No document can adequately describe the approach for all projects; this document should be considered a generally applicable guideline. Projects that are more complex, for example because of project location, site characteristics, integration of unusual or climate sustainable design elements, and other factors will affect the scope of work and design costs associated with a project.

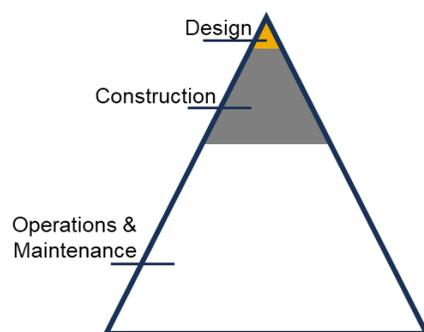
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<sup>1</sup> Engineers and Geoscientists BC Practice Resources, Individual Practice, Guidelines & Advisories are available on the Engineers and Geoscientists BC website: <https://www.egbc.ca/app/Practice-Resources/Individual-Practice/Guidelines-Advisories>

**Note:** Engineers and Geoscientists BC registrants must consider climate change in engineering practice and should be appropriately familiar with practice guidance and resources to address climate change when providing consulting engineering services for buildings. Engineers and Geoscientists BC maintains climate and sustainability resources<sup>2</sup> to support professional engineers to meet this obligation. In addition, practice guidelines and advisories<sup>3</sup> are regularly updated to help registrants adequately address climate change when carrying out professional activities related to buildings.

## 2.0 SELECTION AND APPOINTMENT OF A CONSULTING ENGINEER

A successful project is one which meets the requirements of the owner at an acceptable project lifecycle cost. Lifecycle cost is the long-term operation and maintenance of building assets, and generally account for most of the total cost to design, construct, and operate a building.



While the relative cost of engineering design is small, the role of the engineer is pivotal in meeting the owner's objectives; during design, conditions are set to manage construction, operations, and maintenance cost savings. Selecting a consulting engineering based on cost of services is a false economy and can be a disserve to the project and the owner and all other stakeholders.

ACEC-BC and partner organizations recommend use of *Qualifications Based Selection* (QBS) for identifying and selecting an appropriately competent and qualified consulting engineer for any project. When the consulting engineer with appropriate understanding of the project and suitable qualifications to implement is appointed, they act as a *trusted advisor* to support all partners in identifying and achieving priorities. Selection of a qualified consulting engineer provides the foundation for achieving the best outcomes for the project.

For more information about **Qualification Based Selection**, please consult the InfraGuide's *Best Practice for Selecting a Professional Consultant*. The QBS process is supported by the Federation of Canadian Municipalities and used by infrastructure owners around the world. For more information, please visit the [Yes2QBS website](#).

<sup>2</sup> Engineers and Geoscientists BC Practice Resources, Programs & Resources, Climate & Sustainability are available on the Engineers and Geoscientists BC website: <https://www.egbc.ca/Practice-Resources/Programs-Resources/Climate-Sustainability>

<sup>3</sup> Engineers and Geoscientists BC Practice Resources, Individual Practice, Guidelines & Advisories are available on the Engineers and Geoscientists BC website: <https://www.egbc.ca/app/Practice-Resources/Individual-Practice/Guidelines-Advisories>

ACEC-BC recommends appointment of a consulting engineer through a formal agreement that protects the rights of the owner (or client) and the consultant, identifies the scope of the project, and clearly describes the terms of engagement. Agreements must also support the consulting engineer to comply with professional regulation. The complexity and specific terms of the agreement depend on the size, complexity, risk, duration, and other aspects of the assignment. Several standard agreements are available for use in design assignments; wherever possible ACEC-BC advocate for use of the Canadian Construction Documents Committee *CCDC 31 – 2020 Service Contract Between Owner and Consultant*<sup>4</sup>.

### 3.0 QUALITY MANAGEMENT REQUIREMENTS

All registrants under the *Professional Governance Act*, including individual registrants and firms, practising professional engineering in BC must be registered with Engineers and Geoscientists BC. An individual practising engineering must do so in accordance with applicable quality management requirements, advisories, codes, and other relevant regulations. A firm regulated under the Engineers and Geoscientists BC Permit to Practice program (i.e., any firm practising professional engineering in BC) has responsibility for quality management of engineering practice for the firm. In this way, firms support individual engineers in meeting their professional obligations under the *Professional Governance Act* and associated Engineers and Geoscientists BC Bylaws.

For example, documented quality management practices must include:

- Retention of project documentation (design and review files) for a minimum period of 10-years
- A process for checking engineering design using a standard procedure.
- Independent review of structural engineering design by a professional engineer not originally involved in the design (peer review)
- Independent review of high-risk professional activities
- Field review of the project during construction
- Use of the professional engineer's seal
- Practices for direct supervision of people performing engineering work
- Application of relevant professional practice guidelines

Quality management practices are a necessary and important part of the consulting engineer's *scope of work* and must be provided for in agreed fees for services.

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<sup>4</sup> CCDC 31 – 2020 Service Contract Between Owner and Consultant (<https://www.ccdc.org/document/ccdc31/>).

To support professional engineers to meet the intent of quality management requirements, Engineers and Geoscientists BC maintains guides and other material<sup>5</sup>.

For building projects in British Columbia there are three relevant building codes: City of Vancouver Building Bylaw, the BC Building Code, and the National Building Code. All codes require that professionals, including professional engineers and geoscientists, take responsibility for design and field review through completion and submission of schedules stipulated in the codes.

Each registered professional is required to provide assurance that the submissions provided under their area of responsibility on the project substantially comply with applicable codes, and that field review is sufficient to verify that construction substantially complies with the design documents. Registered professionals in each discipline must be provided with the opportunity to perform field review for the items for which they are responsible<sup>6</sup>. The process entails provision of a full range of services throughout the project for all engineering disciplines.

Involving one consulting engineer in all categories of service to the project is encouraged, particularly with respect to field review. For the purposes of continuity of understanding, responsibility, accountability, coordination, and ease of administration, it is desirable that the design and field review responsibility be undertaken by the same professional engineer.

The practice of hiring consulting engineers for only one category of service for the project and engaging other engineers (either internal to the project owner or client, or other consultants) to complete other categories of service can create gaps in understanding and discontinuity of service. For example, engagement of an engineer to undertake initial planning and another (or others) to undertake design, construction administration, and field review.

#### **4.0 TYPICAL SERVICES OFFERED BY CONSULTING ENGINEERS**

Establishing fees is highly specific to a project, site, time, and circumstances. **Table 2 – Categories of Service Offered by Consulting Engineers for Building Projects** (Appendix) provides a checklist of typical services offered by consulting engineers.

The nature of the individual project determines the scope of required services and the necessary form of agreement. Projects of higher complexity generally require a higher level of service and proportional fees. A suitable engineering budget is based on a well-defined scope or work program, and clearly defined parameters.

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<sup>5</sup> Engineers and Geoscientists BC Practice Resources, Individual Practice, Quality Management Guides are available on the Engineers and Geoscientists BC website: <https://www.egbc.ca/Practice-Resources/Individual-Practice/Quality-Management-Guides>

<sup>6</sup> Please refer to the currently applicable code for full requirements.

## 5.0 METHOD OF REMUNERATION

Engineering fees for a project can be based on one or more of the following calculation methods:

- Method 1: Time Basis
- Method 2: Percentage Cost of Construction
- Method 3: Fixed Fee or Lump Sum

The method selected largely depends on the stage of the project, project complexity, and how well the project is defined. The following schedule describes the preferred method of remuneration associated with the category of service described in **Table 2**. The methods are further described later in this section.

**Table 1 Recommended Method of Remuneration by Category of Service**

Category of Service	Recommended Method of Remuneration
1. Advisory Services	Time Basis
2. Preliminary Design Services	Fixed Fee or Percentage Cost of Construction
3. Design Development and Contract Document Services	Fixed Fee or Percentage Cost of Construction
4. Tender Services	Fixed Fee or Percentage Cost of Construction
5. Construction Related Services	Fixed Fee or Percentage Cost of Construction or Time Basis
6. Resident Engineering Services	Time Basis
7. Project Management Services	Time Basis
8. Construction Management Services	Time Basis

Disbursements are not included in **Table 1** and should be determined and invoiced according to the most recent ACEC-BC Consulting Engineers Fee Guideline<sup>7</sup>.

Accuracy of construction cost estimates can vary and are classified as being *Class A, B, C, or D*. Information regarding the definition of these classes may be found in the Appendix.

### 5.1 METHOD 1: TIME BASIS

The Time Basis method is recommended when the scope of engineering services is difficult to determine, cannot be determined, is not well defined, or when the consultant is not in control of the required time and disbursements at any stage of a project.

All time expended on the assignment is billable including travel, time at the consulting engineer's place of work, and time at the project site or other location required for the project. Unless the consulting engineer's overhead clearly covers administrative services, billable time also applies to technical and administrative service including – for example – scheduling and engaging administrative people to produce correspondence and documents like reports and specifications.

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<sup>7</sup> The ACEC-BC Consulting Engineers Fee Guideline is updated annually, and available on the ACEC-BC website (<https://acec-bc.ca/resources/>).

The consultant can be expected to closely monitor progress and provide regular status reports on the project.

Time Basis of remuneration may incorporate an *Upset Limit*, which is only appropriate when developed in consultation with the client and ensures adequate allocations for additional work.

Time Basis fees should be determined and invoiced according to the most recent ACEC-BC Consulting Engineers Fee Guideline<sup>8</sup> (minimum fees for services).

**Note: Charge Out Rate Adjustments**

**5.2 METHOD 2: PERCENTAGE OF COST OF CONSTRUCTION**

Basing engineering fees on the Percentage of Cost of Construction may be suitable where the cost of the consulting engineering service is a function of the construction or installation cost, and where the project scope and construction (or installation) budget is well defined. Where the cost of construction for an individual discipline within an overall project is under \$1 million, a different method (other than Percentage of Cost of Construction) should be used.

Engineering service agreements should clearly define whether the cost of construction is based on an estimate established at commencement of a project, or on the completed actual construction cost.

Fees for full-time resident engineering are in addition to fees determined under this method. For full-time resident engineering, Method 1 – Time Basis is recommended.

**Table 3** and **Table 4** (Appendix) are recommended to determine the fee budget as a percentage of the cost of construction. PART B: Remuneration for Building Engineering Services describes the use of these tables in greater detail.

**Note: Cost of Construction for Engineering Projects**

The cost of construction includes all of the following:

- The total cost of all materials, equipment, and labour (including duty, taxes, grants-in-aid, and general and sub contractors' overhead and profit) necessary to complete the work for which the consulting engineer prepares drawings and specification or for which the consulting engineer is responsible to the client.
- In the event that the client furnishes material, equipment, services, or other labour that is incorporated in the work, the cost of construction includes the fair market value of those materials or equipment as if newly purchase. In addition, the cost of construction includes the current prices of labour or other services at the time of construction. If construction does not proceed, market prices at estimated time of construction shall prevail.

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<sup>8</sup> The ACEC-BC Consulting Engineers Fee Guideline is updated annually, and available on the ACEC-BC website (<https://acec-bc.ca/resources/>).

- If the owner, client, or contractor furnishes used material or equipment at the owner's (or client's) request, the cost of construction includes the fair market value of those materials or equipment as if newly purchased.

Fee budgets are based on the cost of construction including all extras to the construction contract. No deduction may be made from the consulting engineer's fee because of penalties or damages claimed by the owner or client from the contractor, or other sums withheld from the contractor. The cost of construction does not include professional fees and disbursements payable to the consulting engineer.

### **5.3 METHOD 3: FIXED FEE OR LUMP SUM**

A Fixed Fee or Lump Sum contract is suitable if the scope and schedule of the project are sufficiently defined to allow the consulting engineer to accurately estimate the effort required. This type of contract is frequently developed from time-based projections or specific service requirements for tasks and may also be derived from the appropriate percentage fee method. Disbursements may or may not be included in the lump sum.

This method provides cost certainty for clients and encourages innovation and efficiency by the consultant.

Where projects extend over more than a single year, and in certain circumstances on shorter duration projects, budgets should incorporate adjustment to charge out rates to support continuity of professional service and to reflect changing economic and market conditions.

## **6.0 DISBURSEMENTS, SPECIAL CONDITIONS, AND TAXES**

### **6.1 DISBURSEMENTS**

Unless otherwise agreed between the consulting engineer and the client, and properly reflected in the fee, separate charges are made for disbursements borne by the consulting engineer. Disbursements are determined and invoiced according to the most recent ACEC-BC Consulting Engineers Fee Guideline<sup>9</sup>.

Disbursements are *not* included in the percentage fees in **Table 3** and are to be charged in addition to calculated fees.

### **6.2 SPECIAL CONDITIONS**

Special conditions include assurance, ownership, and insurance, all of which are relevant in determining appropriate fees for service.

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<sup>9</sup> The ACEC-BC Consulting Engineers Fee Guideline is updated annually, and available on the ACEC-BC website (<https://acec-bc.ca/resources/>).

## **Assurance of Professional Design and Field Review**

Consulting engineers undertaking building design services are required to provide professional designs and field review stipulated by the relevant building code and municipal bylaw. The consulting engineer shall submit the necessary letters for the requirements of assurance of professional design and field review as part of the basic service contract.

## **Ownership of Drawings and Copyright**

The parameters of this document are based on ownership and copyright of all engineering drawings, specifications, and other documentation remaining with the consulting engineer. Ownership is frequently confused with copyright; ownership of drawings is governed by the agreement, while copyright is the ownership of the idea embodied in the drawings and the right to reproduce that idea. Drawings, specifications, and other documents are instruments of service for the execution of the project. The client's or owner's right to use the documents is contingent upon payment of the engineer's fee.

Intellectual property rights are further described in the Guidelines on Intellectual Property<sup>10</sup> (June 2009) jointly produced by ACEC-BC, Engineers and Geoscientists BC, and the Architectural Institute of BC.

## **Professional Liability Insurance**

Registrants of Engineers and Geoscientists BC are required to comply with their Bylaws including those regarding primary and secondary professional liability insurance<sup>11</sup>. Should a design assignment require insurance beyond that which is in place and disclosed by the consulting engineer, then the costs associated with placement of additional insurance will be borne by the client and charged as a disbursement. The client may choose to carry a project-specific professional liability insurance policy and may request that the engineer support placement of the policy. Costs for a project-specific policy are the responsibility of the client.

## **6.3 TAX**

All relevant taxes – regardless of the client's ability to recover – are additional and applicable to both fees and disbursements. Consulting engineers should ensure taxes are appropriately understood and applied when invoicing for services and disbursements.

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<sup>10</sup> The Guidelines on Intellectual Property – June 2009 is available on the websites of all three publishing organizations (<https://acec-bc.ca/2009/06/guidelines-on-intellectual-property/>)

<sup>11</sup> Bylaws – Engineers and Geoscientists BC (<https://www.egbc.ca/getmedia/ff95a29b-64f6-49c8-8000-e98c8479248e/Engineers-and-Geoscientists-BC-Bylaws.pdf.aspx>).

## **7.0 RISK SHARED CONSULTING ASSIGNMENTS**

Risk-shared consulting assignments include alternate delivery arrangements are those that differentially share financial risk between project partners including Alliance or Integrated Project Delivery.

Undertaking the necessary design work to assist with proposal preparation within a risk-shared consulting assignment involves considerable effort and risk on the part of the consulting engineer. For that reason, the consultant should be provided full remuneration for proposal development services.

## PART B: REMUNERATION FOR BUILDING ENGINEERING SERVICES

The following section describes the calculation methods commonly used to estimate appropriate remuneration for engineering services. The common methods – Time Basis, Percentage of Cost of Construction, and Fixed Fee or Lump Sum – are defined in Section 5. This section describes application and calculation of fees.

### Method 1 – Time Basis

The Time Basis method may be used for all categories of service in *Table 2 – Categories of Service Offered by Consulting Engineers for Building Projects* (beginning on Page 15). As described, Time Basis is calculated using a combination of hours and agreed fees for services.

### Method 2 – Percentage of Cost of Construction

This method is defined in detail in PART A: Basis for Remuneration, Section 5 and is appropriate for use of basic services as described in *Table 2 – Categories of Service Offered by Consulting Engineers for Building Projects* (beginning on Page 15). Additional services listed in *Table 2* should be remunerated using Method 1 – Time Basis.

*Table 3 – Percentage Fee Scale for Basic Services for New Building Construction* (Page 17) includes the recommended minimum percentage fee scale for basic engineering services (see *Table 2*) for new building construction by building type and category (see *Table 4* on Page 21). “Basic Services” are those included in the fee tables; “Additional Services” are those services that are negotiated separately and are not included in the fee tables.

Per *Table 2 – Categories of Service Offered by Consulting Engineers for Building Projects* this method of calculating appropriate remuneration is suitable for Category 2: Schematic Design Services, Category 3: Design Development and Contract Document Services, Category 4: Tender Services, and Category 5: Construction Related Services. Disbursements are charged in addition to the fee budget described in the tables.

The following schedule is recommended for the purposes of staged payments and for establishing the fee budget represented by each category:

Category	Description	Not Less Than
Category 2	Schematic Design Services	15%
Category 3	Design Development	15%
	Contract Documents	40%
Category 4	Tender Services	5%
Category 5	Construction Related Services	25%

The following sections provide a detailed description of construction items related to building engineering services that are included in the cost of construction for a building. This list supports the defined cost of construction from Section 5.

## **Items Specific to Structural, Mechanical, and Electrical Cost of Construction**

### **Structural**

- Site preloading, ground improvement, shoring, excavation and backfilling, and underpinning for structural work.
- Foundations including piling and pile caps.
- Plain and reinforced concrete, including reinforcing steel, formwork, and expansion joints.
- Structural steel and steel deck, including supply, fabrication, erection, and painting.
- Structural timber including dimensional lumber, glulam, laminated timber, engineered wood, plywood, and timber connections.
- Brick and concrete masonry, including reinforcing steel.
- Structural light gauge steel framing.
- Precast concrete, including supply, fabrication, erection, and finishes.
- Cast iron and aluminium structures, including hardware and connections.
- Architectural, mechanical, and electrical components supports and connections that have to be designed or checked for structural adequacy.
- Other structural items that must be designed or checked for structural adequacy.

### **Mechanical**

- Basic categories of mechanical work, including plumbing, heating, ventilation and sheet metal, refrigeration, HVAC controls, fire protection, insulation, medical gas, compressed air and all standard items associated with these categories.
- Cost of fair new market value of all mechanical equipment supplied by the client.
- Equipment specified or provided by others, such as lubrication systems, air, etc. for which the mechanical consultant has provided services.
- All excavation and backfill pertaining to mechanical work.
- Specialized mechanical systems such as rainwater collection and storage, grey and black water systems, alternate energy systems, etc.
- Integrated assemblies including patient service modules containing medical gases.
- Cost of all installation carried out by the municipality or by utility companies when designed and inspected by the mechanical consultant.
- Weeping subsoil tile systems designed by the mechanical consultant.

### **Mechanical - continued**

- All plain and reinforced concrete in place and structural steel pertaining to mechanical work that is not designed by the structural consultant.
- Cost of architectural grilles, diffusers, louvers, etc. when specified by mechanical consultant.
- Cost of documentation, testing, balancing, and commissioning when specified by the mechanical consultant.
- Specialty work such as Passive House needs to be considered for increased discipline coordination.

### **Electrical**

- Basic categories of electrical work, including (as applicable) normal and emergency power distribution, receptacles, lighting, lighting control, communication distribution and terminations, security systems, life safety systems (including emergency & exit lighting, fire alarm, seismic restraint, firestopping), audio and video systems, nurse call systems, electric heating systems, heat trace, specialized & building grounding systems, lightning protection, raceways & cable tray, metering, electric vehicle chargers, photovoltaic systems and all standard items associated with these categories.
- Electrical connections to equipment specified by other consultants (for example, architectural, mechanical, food service, door hardware etc).
- Installation and/or connection cost of all electrical equipment supplied by the client. Costs of receiving, storage, transportation as required.
- Integrated assemblies, including patient service modules containing electrical outlets, lighting, and communication systems.
- Electrical site services conduits, manholes, junction boxes and other similar associated electrical materials. Civil works such as excavation and backfill pertaining to electrical construction to be carried under civil cost estimates.
- Cost of all installation carried out by the municipality or by utility companies, if deemed to be a project cost.
- Cost of start-up, permits, documentation, testing, demonstrations, and commissioning.
- Overhead costs, escalation, design and construction contingency.

### **Method 3 – Fixed Fee or Lump Sum Contract**

This method is defined in detail in PART A: Basis for Remuneration, Section 5. No further description is included here.

## APPENDIX:

Tables		
<b>Table 2</b>	Categories of Service Offered by Consulting Engineers for Building Projects	Page 15
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<b>Table 4</b>	Index of Building Types and Categories	Page 21

Additional Information	
<b>Cost Estimate Classification Definitions</b>	Page 24

**Table 2 – Categories of Service Offered by Consulting Engineers for Building Projects**

NOTE: When remuneration Method 2 – Percentage of Cost of Construction is used, “Basic Services” for Preliminary Design, Design Development, Tender Services, and Construction Related Services are those covered by the fees in Table 3 and Table 4.

Basic Services
Additional Services

1, ADVISORY SERVICES	2, SCHEMATIC DESIGN SERVICES	3, DESIGN DEVELOPMENT AND CONTRACT DOCUMENT SERVICES	4, TENDER SERVICES
	Preliminary design reports, alternative conceptual proposals, sketches, schematics, specifications	Detailed design Working drawings Specifications and tender documents Letters of Assurance	Preparing tender call documents Reviewing tenders submitted and advising
Preparation or review of engineering program Expert testimony Appraisals, valuations, studies, reports Feasibility analysis Accident investigations Preliminary concept sketch Preliminary specification notes Development of work estimate Litigation / Claims / Insurance assistance Detailed analysis of owning and operating costs Special grants and loans Translation and interpretation Project management scheduling assistance Assistance in preparing purchase enquiries Value engineering	Scope of project Statement of probable cost Scheduling Documents for financing Investigative surveys, geotechnical Permits and licenses Environmental assessments Revision of existing designs Life cycle costing Detailed cost estimates Engineering surveys, profiles, and cross-sections Sustainability studies Energy and other forms of modelling services Sustainability charrettes	Statement of probable cost Detailed cost estimates Reinforcing bar schedules Design and documentation not in contract Provision for owner supplied equipment not in contract Demolition documents Tenant improvements Fast-track construction or sequential tendering Preparation of shop drawings Environmental design Energy and other forms of modelling services LEED® or other sustainability program documentation	Alternative conceptual proposals Prequalification of contractors Coordinating other consultants' documents Non-tender construction contracts Bills, materials, detailed cost estimates Tender advertisement

**CONTINUED: Table 2 – Categories of Service Offered by Consulting Engineers for Building Projects**

5, CONSTRUCTION RELATED SERVICES	6, RESIDENT ENGINEERING SERVICES	7, PROJECT MANAGEMENT SERVICES	8, CONSTRUCTION MANAGEMENT SERVICES
Review of shop drawings Field review Progress review Monitoring of testing Change order costing review Document interpretation Payment recommendation Substantial performance review Advising client and contractor of continuing or newly observed defects or deficiencies Letters of assurance Yearend warranty review (as required)			
System start-up and documentation Post-warranty period follow-up Fast-track construction or sequential tendering Maintenance of manuals and drawings Certification and testing of systems Commissioning / training Environmental monitoring Record drawings Contract administration LEED® or other sustainability documentation and certifications services LEED® or other sustainability program compliance energy model	Supplying resident staff on the project to determine if the contractor is carrying out their work in general conformance with the contract documents	Consultant selection Conceptual studies Economic feasibility Planning / scheduling / monitoring and controlling Estimating / budgeting and cost control Arranging financing Procurement Risk management Commissioning	Contract strategy, administration and expediting Construction logistics, planning, scheduling, and labour forecasts Labour relations, safety Field office management, temporary facilities Materials receiving and warehousing Progress monitoring, trending, and reporting Cost performance monitoring, trending, and claims processing

**Table 3 – Percentage Fee Scale for Basic Services for New Building Construction**

BUILDING CATEGORIES (Defined in Table 3, page 24)			MINIMUM NET PERCENTAGE FEE SCALE FOR BASIC SERVICES								
			NEW CONSTRUCTION								
			AREA: 500 – 2000 m <sup>2</sup>			AREA: 2000 – 5000 m <sup>2</sup>			AREA: OVER 5000 m <sup>2</sup>		
			Struct	Mech	Elect	Struct	Mech	Elect	Struct	Mech	Elect
<b>1 SIMPLE</b>			6.0	6.25	6.75	5.0	5.5	6.0	4.0	5.0	5.5
<b>2 CONVENTIONAL</b>			6.0	6.75	7.25	5.0	6.0	6.5	4.5	5.5	6.0
<b>3 ADVANCED</b>			6.5	7.25	7.75	6.0	6.5	7.0	5.5	6.0	6.5
<b>4 COMPLEX</b>			7.5	7.75	8.25	6.5	7.0	7.5	6.0	6.5	7.5
<b>5 SPECIALIZED</b>			8.0	8.75	9.25	7.5	8.0	8.5	7.0	7.5	8.0
<b>6 HEALTH CARE FACILITIES</b>			7.5	8.25	8.75	6.5	7.5	8.0	6.0	7.0	7.5
<b>7 COMMERCIAL PROJECTS</b>	(1) low-rise office/retail	(a) market	6.0	5.75	6.25	5.0	5.0	5.5	4.0	4.5	5.0
		(b) non-market	6.5	6.25	6.75	5.5	5.5	6.0	4.5	5.0	5.5
	(2) high-rise office(4+ storeys)	(a) market	6.0	5.75	6.25	5.25	5.0	5.5	4.5	4.5	5.0
		(b) non-market	6.5	6.25	6.75	5.75	5.5	6.0	5.0	5.0	5.5
	(3) shopping centre	(a) strip mall	6.0	5.75	6.25	5.0	5.0	5.5	4.0	4.5	5.0
		(b) mall + dept. store	6.5	6.25	6.75	5.5	5.5	6.0	4.5	5.0	5.5
	(4) tenant improvement	(a) market	Time or Lump Sum Basis								
		(b) non-market	Time or Lump Sum Basis								
	(5) motor hotel	(a) simple	6.0	6.25	6.75	5.0	5.5	6.0	4.0	5.0	5.5
		(b) complex	6.5	6.5	7.0	5.5	6.0	6.5	4.5	5.5	6.0
	(6) hotel	(a) simple	6.0	6.75	7.25	5.25	6.0	6.5	4.5	5.5	6.0
		(b) complex	6.5	7.25	7.75	5.75	6.5	7.0	5.0	6.0	6.5

**CONTINUED: Table 3 – Percentage Fee Scale for Basic Services for New Building Construction**

8 CUSTOM/INDIVIDUAL	AREA: 0 – 2000 m <sup>2</sup>			AREA: 2000 – 5000 m <sup>2</sup>			AREA: OVER 5000 m <sup>2</sup>		
	Struct	Mech	Elect	Struct	Mech	Elect	Struct	Mech	Elect
Single Family	7.0 (1)	10.0	12.0	7.0 (1)	8.0	10.0	8.0	7.0	8.0
Day Care	8.0	10.0	12.0	9.0	8.0	10.0	10.0	7.0	8.0
Restoration/ Decoration	Time or Lump Sum Basis								
Interior/ Tenant Improvements	Time or Lump Sum Basis								
Clinics	8.0	10.0	12.0	9.0	8.0	10.0	10.0	7.0	8.0

9 MULTIPLE HOUSING	MINIMUM NET PERCENTAGE FEE SCALE FOR BASIC SERVICES				
	NEW CONSTRUCTION				
	Duplex/ Townhouse (slab on grade)	Low-Rise 1-4 storeys (reinforced concrete garage)	Mid-Rise 5-6 storeys (non-combustible)	High-Rise 7 – 15 storeys	High-Rise over 15 storeys
	<b>STRUCTURAL FEES</b>				
(a) Market	5.5 Unit repetition may reduce the design phase component	5.0 Unit repetition may reduce the design phase component	4.5	4.0	3.5

**CONTINUED: Table 3 – Percentage Fee Scale for Basic Services for New Building Construction**

9 MULTIPLE HOUSING		MINIMUM NET PERCENTAGE FEE SCALE FOR BASIC SERVICES				
		NEW CONSTRUCTION				
		Duplex/ Townhouse(slab on grade)	Low-Rise 1-4 storeys(reinforced concrete garage)	Mid-Rise 5-6 storeys(non- combustible)	High-Rise 7 – 15 storeys	High-Rise over 15 storeys
(a) Market	Senior Citizens & Social Housing	as above 12%	market plus 0.25%			
(a) Market	<b>NUMBER OF SUITES</b>	<b>MECHANICAL FEES</b>				
	(i) 1 - 10	non % based fee	non % based fee	non % based fee	non % based fee	non % based fee
	(ii) 10 - 40	5.75	5.5	5.25	4.75	4.5
	(iii) 40 – 100	5.25	5.0	4.75	4.5	4.25
	(iv) 100 – 150	4.75	4.5	4.5	4.0	3.75
	(v) over 150	4.5	4.25	4.25	3.75	3.5
(a) Market	Senior Citizens & Social Housing		market plus 0.25%			
(a) Market	<b>NUMBER OF SUITES</b>	<b>ELECTRICAL FEES</b>				
	(i) 1 – 10	non % based fee	non % based fee	non % based fee	non % based fee	non % based fee
	(ii) 10 – 40	6.25	6.0	5.5	5.25	5.0
	(iii) 40 – 100	6.0	5.75	5.25	5.0	4.75
	(iv) 100 – 150	5.5	5.25	4.75	4.5	4.25
	(v) over 150	5.0	4.75	4.5	4.0	3.75
(a) Market	Senior Citizens & Social Housing		market plus 0.50%			
10 SEISMIC UPGRADE	(a) Evaluation	Time or Lump Sum Basis				
	(b) Design/ Construction	Time or Lump Sum Basis				

**CONTINUED: Table 3 – Percentage Fee Scale for Basic Services for New Building Construction**

Notes

- The sliding scale for building projects reflects their size and complexity.
- For alterations, renovations, or projects of low construction cost, use either (Method 2 x 1.7) or Method 1.
- For projects involving other than a single construction contract (i.e., fast-track or sequential tendering) where Method 2 is used, fees should be 25% higher than those indicated in the above table.
- Civil sitework associated with buildings, building envelope science, acoustic engineering and sustainability consulting, geotechnical engineering and environmental, etc., are additional services for which fees are not included in the above; for this use either Method 1 – Time Basis, or Method 3 – Fixed or Lump Sum.
- These fees apply where the structural, mechanical, or electrical consultant is a sub-contractor to a managing consultant; where the structural, mechanical, or electrical consultant acts as the prime consultant, refer to Method 1 – Time Basis.
- As a result of the 2020 update to the National Building Code of Canada (NBCC 202012), institutional buildings in moderate and high seismic zones require a resilience analysis and design for a 5% in 50-year event in addition to the 2% in 50-year life safe design. For this circumstance, a 0.5% structural fee should be added to the base fee.

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<sup>12</sup> National Building Code of Canada 2020: <https://nrc.canada.ca/en/certifications-evaluations-standards/codes-canada/codes-canada-publications/national-building-code-canada-2020>

**Table 4 – Index of Building Types and Categories**

(S = Structural, M = Mechanical, E = Electrical)

	S	M	E		S	M	E		S	M	E
Administrative Offices	3	3	3	Exhibition Display	5	6	6	Planetarium	5	4	4
Agricultural	1	1	1	Extended Care Unit	6	6	6	Police Station	4	3	3
Air Terminal	4	4	4	Fire Station	4	3	3	Pool (swimming)	4	4	4
Aircraft Hangar	2	2	2	Freight Terminal	3	4	4	Post Office	4	4	4
Amusement Park	4	4	4	Funeral Home	4	4	4	Processing Plant	3	3	3
Animal Care Facility	4	4	4	Gas Station	2	3	3	Radiology	6	6	6
Aquarium	4	5	5	Grandstand	3	3	3	Radio Station	5	5	5
Archives	4	4	4	Health Care Centre	6	6	6	Rail Terminal	4	4	4
Arena	4	4	4	Health Club/ Sports Club	4	3	3	Recreation	4	4	4
Armed Forces Base	3	2	2	Heritage	8	8	8	Reformatory	3	5	5
Armoury	2	2	2	Hospital	6	5/6	5/6	Religious Building	4	4	4
Art Gallery	5	5	5	Hotel	7	7	7	Research	5	5	5
Auditorium	4	4	4	Housing (custom)	8	8	8	Residence (student)	9	9	9
Bank/ Financial Company	3	3	3	Housing (multiple)	9	9	9	Restaurant	3	4	4
City Hall	4	4	4	Housing (single family)	8	8	8	Restoration	8	8	8
Clinic (diagnosis and treatment)	6/8	6/8	6/8	Inpatient Accommodation	6	6	6	Retail	7	7	7
				Intermediate Care Unit	6	6	6	Rink (covered)	3	4	4
Club/ Bar	4	3	3	Laboratory	6/8	6/8	6/8	School (elementary)	4	4	4
College	4	4	4	Legation	4	4	4	School (secondary)	4	4	4

**CONTINUED: Table 4 – Index of Building Types and Categories**

	S	M	E		S	M	E		S	M	E
Commercial	7	7	7	Library	4	4	4	Scientific	5	5	5
Communications	5	5	5	Lounge	4	4	4	Senior Citizens Housing	9	9	9
Community Centre	4	4	4	Maintenance	2	2	2	Service Garage	2	2	2
Computing Centre	3	5	5	Manufacturing Plant	3	4	4	Shopping Centre	7	7	7
Consulate/ Embassy	4	4	4	Mausoleum	4	4	4	Social Housing	9	9	9
Convalescent Home	6	6	6	Medical/ Dental Offices	8	8	8	Stadium	4	3	3
Convent	4	4	4	Motor Hotel	7	7	7	Stock Exchange	3	3	3
Convention Hall	3	3	3	Museum	4	3	3	Storage Plant (specialized)	3	3	3
Correctional Facility	4	5	5	Nursing Home	6	6	6	Telephone Equipment	3	3	3
Country Club	4	3	3	Observatory	5	4	4	Television Facility	5	5	5
Courthouse	4	4	4	Offices (commercial)	7	7	7	Tenant Improvements	7/8	7/8	7/8
Crematorium	4	5	5	Offices (owner occupied)	7	3	3	Terminal (transport)	4	4	4
Customs/ Immigration	3	2	2	Opera House	4	5	5	Townhouse	9	9	9
Day Care Centre	8	8	8	Operating Room	6	6	6	Treasury/ Mint	4	4	4
Decorative Work	8	8	8	Parking Garage/ Structure	2	2	2	University	4	5	5
Duplex	9	9	9	Parliament Building	4	4	4	Warehouse (max. 10% offices)	2	1	1
Emergency Department	6	6	6	Passenger Terminal	4	4	4	Zoo	4	4	4
Exhibition Building	4	3	3	Phys Ed Complex	4	4	4				

**CONTINUED: Table 4 – Index of Building Types and Categories**

<b>1</b>	<b>Simple</b>	Simple, utilitarian character without complication of design; a minimum of finish, structural, mechanical, and electrical design
<b>2</b>	<b>Conventional</b>	Conventional character requiring normal detail, structural, mechanical, and electrical design
<b>3</b>	<b>Advanced</b>	Moderate complexity of design requiring advanced structural, mechanical, and electrical design
<b>4</b>	<b>Complex</b>	Exceptional character and complexity of design requiring comparatively large extent of structural, mechanical, and electrical design (elements arising from post-disaster or other complexity as an example).
<b>5</b>	<b>Specialized</b>	Specialized buildings and other facilities requiring special design skills or expertise, much precise detailing and intensive coordination.
<b>6</b>	<b>Health Care Facility</b>	Self-explanatory/ building type specific
<b>7</b>	<b>Commercial Project</b>	Non-market office refers to special use tenancies (e.g. government or public agencies)
<b>8</b>	<b>Custom/Individual</b>	Highly particular or personalized requirements; extreme extent of design, coordination and service for size of facility
<b>9</b>	<b>Multiple Housing</b>	Self-explanatory / building type specific

## **ADDITIONAL INFORMATION: COST ESTIMATE CLASSIFICATION DEFINITIONS**

It is important to recognize that until the project is constructed, a cost estimate represents the best estimate of the quality surveyor (QS) based on the information available at the time. Completeness and accuracy of a cost estimation is influenced by many factors, including the project status and development stage. Estimates have a limited life and are subject to inflation and fluctuating market conditions.

The following estimates and their classification definitions are suggested for engineering projects:

<b>Class A Estimate</b> (±10 – 15%)	A detailed estimate based on quantity take-off from final drawings and specifications. It is used to evaluate tenders or as a basis of cost control during day-labour construction.
<b>Class B Estimate</b> (±15 – 25%)	An estimate prepared after site investigation and study has been completed and the major systems defined. Class B is based on a project brief and preliminary design and is used for obtaining effective project approval and for budgetary control.
<b>Class C Estimate</b> (±25 – 40%)	Estimate is prepared with limited site information and based on probable conditions affecting the project. Class C represents the summation of all identifiable project elemental costs and is used for program planning, to establish a more specific definition of owner needs and to obtain preliminary project approval.
<b>Class D Estimate</b> (±50%)	A preliminary estimate which, due to little or no site information, indicates the approximate magnitude of cost of the proposed project, based on the owner's broad requirements. This overall cost estimate may be derived from lump sum or unit costs for a similar project. It may be used in developing long term capital plans for preliminary discussion of proposed capital projects.