Overview
This document supplements the Smithsonian Institution Office of Facilities Engineering and Operations (OFEO) Special Conditions for Architect/Engineer Services. It describes the background, policies and procedures for estimating construction costs and budgets.

Goal
The goal of this document is to facilitate OFEO's review of budgets and estimates by establishing standard guidelines and formats for cost estimating for use by A/E's.

Objectives
This document will help the reader to:

- understand the different kinds of budgets and estimates used by OFEO
- understand construction contract types issued by the Smithsonian
- understand construction estimate cost factors
- prepare construction estimates for submission to OFEO

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General Information

Purpose

Estimates are prepared to provide accurate cost assessments for both total project and construction costs. Some specific purposes of estimates are:

- to ensure project costs are within the authorized dollar amount
- as a comparison of costs on previously constructed facilities
- to compile a record of historical costs
- to establish the "design to cost" limits for the Architect/Engineer (A/E)
- to provide a means of cost control during design
- to determine the necessity and extent for bid alternates
- as a standard of comparison for bids/offers prior to award of the construction contract
- as a comparison for evaluating the schedule of values submitted by the Contractor
- to evaluate the availability of funding for proposed Change Orders
- as a basis for negotiation for bids, offers, and other proposals

The Smithsonian Estimate

In compliance with the Federal Acquisition Regulations (FAR), an independent estimate of construction costs, the "Smithsonian Estimate," or Independent Government Estimate” must be prepared and furnished to the Smithsonian's Contracting Officer prior to bid/offer opening or negotiations with the Construction Contractor. This estimate is prepared by the Office of Facilities Engineering & Operations, Cost Engineering Division.

General Information on SI Construction Contracts

The Smithsonian Institution utilizes the FIXED PRICE contracting method for construction, in either of the following formats or in a combination of them both:

- Lump Sum Basis: a lump sum dollar amount is paid for the total work or defined parts of the work, such as bid alternates.
- Unit Price Basis: a unit price is paid for a specified quantity of work units.
Types of Cost Estimates

Preliminary Project Budget Estimates (Planning)

Preliminary project budgets are figured by estimating facilities construction costs as well as line items for related fees, contingencies and other project costs. As programming and preliminary design information becomes available, the preliminary project budget estimate may be refined and updated. Preliminary Project Budget Estimates are used by the Smithsonian in long-range project planning and serve as the basis for funding requests. The following format is generally used:

- **Preliminary Project Budget Estimate**: Building systems estimate Uniformat II indicating costs for building construction (architectural + major engineering systems) and site development. Various multipliers or line items are included for: architect/engineer fees, construction management and inspection fees, furniture, furnishings and equipment, move-in and occupancy, escalation, and design and construction contingencies.

A **Project Prospectus** for major new construction often includes an estimate of First Year Program Expenses and an estimate of Annual Operating Costs as well as the Preliminary Project Budget Estimate described above. Requirements for the preparation of these will be outlined in the Scope of Work for the Project Prospectus.
When an estimate based on conceptual or schematic drawings is required, the A/E shall prepare a Project Budget Estimate in a format similar to the Preliminary Project Budget Estimate described above. Depending on the level of detail available in the drawings, direct costs subtotals are arrived at by estimating in the building systems Uniformat II format. The following indirect costs may be considered:

- design contingency,
- material and labor burden,
- overhead and profit,
- prime commission on subcontract work,
- escalation to the mid-point of construction,
- area factor,
- site factor (if applicable),
- general and supplementary conditions,
- bond,
- A/E fees,
- construction management and inspection fees,
- construction reserve contingency.

Line items are also included for furniture, furnishings and equipment, security devices and special equipment.

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Construction Cost Estimates are prepared throughout the design process, increasing in detail as they progress from Design Development through Construction Documents to submission of the Final Documents. A construction cost estimate is a required deliverable along with each design submission (always at 35%, 95% and 100%; sometimes an intermediate estimate at 50-75% is required). This helps ensure that the design is within budget and targets problem areas in cost which could effect final design. The required format is attached. The components of Construction Cost Estimate are generally as follows:

- **Direct Costs**: direct material and labor costs for the prime and all subcontractors

- **Indirect Costs**: material tax and labor burden; overhead; profit; prime commission on subcontractor work; design contingency*; escalation to the mid-point of construction; area factor; site factor (if applicable) general and supplementary conditions; bond.

* A design contingency is NOT allowed in the construction cost estimate based on the 95% Construction Documents estimate nor on 100% Final Documents. The final construction cost estimate becomes the **independent Smithsonian Estimate of construction costs**.

Separate cost estimates are required for bid/procurement packages that are independent of the building design, such as for furniture, furnishings, signage, special equipment, security devices, exhibition construction, and any other items not included in the building construction documents.
### Types of Cost Estimates, Continued

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<th>Proposed Change Estimate</th>
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<td>When changes over $25,000 are proposed to an existing construction contract, an independent Smithsonian Estimate must be prepared by the OEDC or its authorized consultant (A/E firm or Cost Estimating firm). The Smithsonian Estimate is compared to the Contractor's estimate of costs. The Contracting Officer must approve the Contractor's final Change Order proposal before &quot;Notice to Proceed&quot; is authorized. Only when no agreement in costs can be reached between the Contractor and the Smithsonian or when the cost cannot be estimated because of unknown conditions, will Change Orders be considered on a Time and Materials (T/M) basis. The standard Proposed Change Estimate format, which includes complete, detailed cost itemization and cost summary, is available upon request from Office of Engineering Design &amp; Construction (OEDC).</td>
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### Estimate Cost Factors

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<th>OFEO Criteria</th>
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<td>The OFEO Cost Engineer, in agreement with the Office of Contracting (OCon), establishes and maintains guidance criteria for use by A/E estimators in the preparation of estimates.</td>
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<td>A current list of Davis-Bacon wage rates, prepared by the US Department of Labor, is available from the OFEO Cost Engineer for all geographic areas where the Smithsonian Institution (SI) has construction activity. These wage rates are used in determining direct labor costs on federally funded projects.</td>
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Estimate Cost Factors, Continued

Material Tax and Labor Burden

Material Tax and Labor Burden is composed of:

1. Material and equipment taxes as applicable.
2. Labor Burden for supervisory personnel (salaried people working in field and office) shall consists of:
   - Social security and Medicare taxes
   - Federal unemployment taxes (FUTA)
   - State unemployment taxes
   - Major medical, pension, vacation, disabilities and any other additional benefits provided by the employer
   - Workmen’s compensation
   - General and Excess liability
3. Labor Burden for Craft Labor (covered by wage scales) shall consists of:
   - Social security and Medicare taxes
   - Federal unemployment taxes (FUTA)
   - State unemployment taxes
   - Health, welfare and pension (fringes)
   - Workmen’s compensation
   - General and Excess liability

Overhead and Profit

Generally, estimates shall show 10% overhead and 10% profit for both the Prime (General Contractor) and all Subcontractors. However, depending on the size and complexity of the project, these factors may be adjusted upward or downward at the discretion of the OFEO Cost Analyst or OCon. When lump sum quotes from subcontractors are shown in the estimate, they shall already include overhead and profit.

Prime Commission on Subcontractor Work

Generally, the Prime is allowed a 10% commission (mark-up) on subcontractor work. Once again, this factor may be adjusted at the discretion of the OFEO Cost Analyst or OCon.

Escalation

The A/E will include escalation from the date of the estimate to the mid-point of construction. The escalation factor and mid-point of construction shall be enumerated in the estimate.
Area Factor

This represents an adjustment to costs for material and labor outside the Washington, DC, metropolitan area. They are derived from historical cost indices, such as Engineering News Record and R.S. Means City Cost Index. Washington, DC, is used as the base factor (1.00).

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**General and Supplementary Conditions**

This is a variable markup taking into account the various requirements of generic and project-specific conditions. They may include: mobilization and demobilization; personnel/property protection and barricades; ingress and egress to the site; demolition and removal of debris; testing; contractor and guard overtime; off-hours work; supervision; project management; field office; office overhead; and any other condition affecting the Contractor's ability to perform the Work.

**Bonds and Insurances**

The A/E shall include Bonds and Insurances the contractor is required by contract to possess. The estimate shall show these amounts as separate line items.

**Design Contingency**

The A/E shall provide a design contingency which he considers reasonable for that stage of design development. The A/E shall provide the rationale to support this contingency in his qualifications statement.

**Construction Contingency**

This is a variable markup that could range from 5% to 20% in a Project Budget Estimate to allow for a construction reserve to cover unforeseen and unknowable circumstances particular to the site.
**Estimate Formats and Procedures**

**General Formats**
All estimates shall consist of back-up *worksheets* and a cover *summary* sheet. The worksheets for construction and proposed change estimates shall organize item descriptions according to Uniformat II.

**Procedures**
A/E’s shall consult with the OFEO Cost Analyst prior to beginning design projects. Historical data, cost factor information and other guidance criteria will then be made available. In addition, the A/E may also obtain MS EXCEL spreadsheet files with standard OFEO estimating formats.

**EXCEL spreadsheet files**
The Standard Construction Cost Estimate Summary format and Cost Estimate Worksheet format are available from OFEO in both hard copy form and on diskette.

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<tr>
<td>Construction Cost Summary.xls</td>
<td>Construction Cost Estimate Summary</td>
<td>Summary sheet for all direct and indirect costs, mark-ups and final total construction cost</td>
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**DISCLAIMER**
OFEO does not guarantee the integrity of the files, formats, formulas nor linkages between spreadsheets. Calculations should be manually spot checked. Accuracy of calculations is the responsibility of the spreadsheet user.

**Attachments**
Construction Cost Estimate Summary

**Questions**
See OFEO Cost Analyst

**END OF DOCUMENT**