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The Owner's Estimate Requirements Document

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Abstract— The Estimate Requirements Document is a planning document that should be used by owner companies to clarify goals, objectives, expectations, and responsibilities to 3rd party providers (e.g., engineering contractors) preparing capital project estimates for owner facilities. The Estimate Requirements Document helps to facilitate successful estimate completion in an effective and timely manner. This paper will discuss the typical content to be included in an Estimate Requirements Document, which will provide clarity to 3rd party estimate providers.

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Introduction

The Estimate Requirements Document is a planning document that should be used by owner companies to clarify goals, objectives, expectations, and responsibilities to 3rd party providers (e.g., engineering contractors) preparing capital project estimates for owner facilities. The Estimate Requirements Document will help to facilitate successful estimate completion in an effective and timely manner.

The Estimate Requirements Document is a part of the overall estimate planning process undertaken by the owner. The owner should prepare a draft Estimate Requirements Document that is reviewed with their 3rd party estimate providers (consultant). Any clarifications or changes are documented, and a final Estimate Requirements Document is approved and signed by owner and consultant representatives. Upon approval of the Estimate Requirements Document, estimate kickoff sessions are held to communicate the approved basis in order to proceed with estimate development. Any subsequent changes required should be approved and documented through a formal change management process.

The Estimate Requirements Document may be used as the starting point for the Estimate Plan, which is prepared by the 3rd party estimate provider. The Estimate Plan should identify the specific activities, methodologies, schedule, etc. that will be undertaken to prepare the estimate on behalf of the owner.

The Estimate Plan is later converted to the Basis of Estimate Document (BOE) which is to be prepared by the consultant to accompany the estimate when submitted to the owner; and documents all aspects of the development and preparation of the estimate. The extent (comprehensiveness) to which the following sections of the Estimate Requirements Document are completed will be dependent on the type of project, the class of estimate, and other variables. It is recommended to include as much of the following information as possible.

Estimate Requirements Content

The following are typical content sections to be included in an Estimate Requirements Document.

Purpose of the Estimate

The owner should specify the purpose and objective of the estimate, and identify the intended class of estimate to be prepared. Explain what the estimate will be used for and by who. Describe the overall facility type and location. If the consultant will be estimating only a portion of a larger estimate (either a part of a larger facility, or only certain disciplines), explain how this portion of the estimate fits into the bigger picture.

Key Estimate Development Milestones

The owner should identify key milestones to be met by the consultant during estimate preparation, and the expected dates for estimate completion and review cycles. The owner should require the consultant to prepare and present a cost estimate plan and schedule that identifies key estimating activities for all primary elements of the estimate, and the key milestones for estimate inputs and outputs (from/to external sources, including owner and consultant responsibilities). The consultant's estimate plan should be integrated with the engineering, procurement, and other project plans.

Project Scope and Execution Plan Summary

The owner should summarize the overall project scope and execution plans for each project phase. Identify the process and utility (support) units of the facility and their capacities. Indicate significant factors such as contracting, fabrication, and modularization strategies if applicable.

Construction, Fabrication and Operating Parameters

The owner should identify annual average weather conditions at the facility's site; along with maximums, minimums, and time of year that they occur. Identify design basis criteria such as design pressures and temperatures, metallurgies, etc. as applicable. Identify known soil conditions. Identify distance to major population centers, infrastructure availability, etc. as applicable.

Project Execution Schedule Basis

The owner should provide a summary execution schedule (by facility, process unit, etc.) if available. Any known schedule events that may impact costs should be identified (weather windows for material deliveries, operating plant outages, union contract expiration dates, planned downtimes, etc.).

Estimating Methodology

The owner should specify that the consultant utilize the best practical estimating methodologies consistent with the agreed level of project scope definition; and that all methodologies used in preparing the estimate are identified in the Basis of Estimate. If the owner desires to specify the use of a particular estimate methodology, then that should be specified here.

Estimate Report Format

The owner should specify that the estimate will be reported in the agreed upon Project Code of Accounts (COA). The COA should incorporate both the Work Breakdown Structure (WBS) and the Cost Breakdown Structure (CBS). The WBS provides the functional/geographical breakdown of the project. The CBS provides the discipline/resource breakdown of the project. The specific Project Code of Accounts structure should be reviewed and agreed upon by the owner and consultant.

The owner should specify a Cost Estimate Summary Format that incorporates the COA, and require that the consultant provide the estimate using this format. Typically, the owner will not prescribe how the consultant structures the estimate at a working or detail level; however the consultant should describe (within the estimate plan) their estimating approach and tools, and identify how the estimate results will be effectively mapped to the Cost Estimate Summary Reporting structure required by the owner.

The owner should specify the information required in the estimate detail reports, and should normally include (at a minimum) the quantities, units of measure, hours per unit, labor hours, labor cost per hour, labor cost, material cost per unit, material cost, subcontract cost per hour, subcontract cost, and total cost for each estimate line item. If the nature of the project dictates the use of remote construction camps, then all subcontract costs should also indicate the subcontract hours required in order to facilitate estimation of required camp facilities and indirects (if applicable).

Note that the consultant will often prepare the estimate using their typical tools and reporting structures, and then cross-reference the resulting estimate costs to the owner's format. The owner should be flexible in working with the consultant to agree on a final estimate format that meets the owner's needs, but which does not substantially alter the consultant's standard estimating methods.

Units of Measure

The owner should specify the type of units of measure (i.e., metric, imperial) to be used in the estimate, and any exceptions that may apply.

Currency and Exchange Rates

The owner should specify the base currency to be used in the estimate; and indicate the exchange rates to be used for equipment or other purchases made using a different currency.

Rounding

The owner should specify how the estimated costs will be rounded, both at the detail and all summary levels of the estimate; or if delegated to the consultant then require the consultant to provide this information for owner review.

Process Equipment Pricing

The owner should indicate the expected percent of equipment costs to be based on firm quotes, budgetary quotes, in-house pricing, or other basis. A summary of the expected bidding process may be included indicating such issues as minimum number of bidders, how bids are normalized for bid evaluation purposes, how long bids should be valid for, etc. The owner may supply a current version of the equipment list with targeted items for firm quotes identified.

The owner should specify how shop inspection, testing, freight, vendor representatives required during construction, ladders and platforms associated with equipment, equipment commissioning and start-up, related travel, and other similar services associated with process equipment should be estimated; or if delegated to the consultant then require the consultant to provide this information for owner review.

If the owner will be purchasing process equipment directly, then this should be identified. Clarify whether the costs for owner-purchased equipment will be provided to the consultant for inclusion in the consultant's estimate, or whether these costs will be excluded from the consultant's estimate.

The owner should specify the use of design allowances for process equipment, or if delegated to the consultant then require the consultant to provide this information for owner review.

Spares

The owner should specify the various types of spare parts (capital spares, maintenance spares, commissioning and start-up spares) to be included in the estimate, and where in the COA that they should be accounted for. In general, accounting for spares requires consideration of financial accounting rules and operating philosophy.

The owner should specify how the costs for each type of spare will be accounted for (i.e., individually estimated, historical percentages or data, reference costs, etc.), or if delegated to the consultant then require the consultant to provide this information for owner review.

Non-Process Equipment Pricing

The owner should clarify (using the COA as guidelines) the segregation between process equipment versus non-process equipment purchased for use during operation of the permanent facilities, and how they should be accounted for. Such equipment may include mobile equipment (front-end loaders, bucket wheels, excavators, etc.), rolling stock (rail locomotives, cars, etc.), cranes, personnel vehicles (cars, vans, busses, etc.), maintenance vehicles (fork lifts, man-lifts, bundle pullers, etc.), emergency vehicles, (fire truck, ambulance, etc.), fire protection and safety equipment (extinguishers, hose reels, etc.), lab equipment, office computers, etc. Note – this equipment is not Construction Equipment.

Bulk Commodity Material Quantities

The owner should specify the expectation on the methodologies to be used to develop the material quantities for bulk commodities by discipline; or if delegated to the consultant then require the consultant to provide this information for owner review. Such information should include the extent of quantities derived from CAD or other modeling software, and identify how remaining quantities will be generated (material take-offs from design drawings, sketches, factored, etc.).

Bulk Material Quantity Take-Off Allowances

The owner should specify that the consultant explicitly identify the material take-off allowances by commodity or discipline included in the estimate for known but undefined quantities. For each commodity, the owner should specify that the consultant document the rationale for the allowance in relation to the level of engineering definition and methods used to develop the estimated quantities in the BOE.

Bulk Material Construction Waste Allowances

The owner should specify that the consultant explicitly identify construction waste allowances (i.e. cutting waste for pipe or wire) by commodity included in the estimate; and document the basis for the allowance (historical percentages, discussion with specialists, etc.) in the BOE.

Bulk Commodity Material Pricing

The owner should specify the expectation regarding the percent of bulk material costs that will be based on firm quotes, budgetary quotes, in-house pricing, etc. The owner should specify that the consultant identify the bulk material pricing basis by commodity. Any special considerations, such as use of a site concrete batch plant, should be identified.

If the owner will be purchasing bulk materials directly, then this should be identified. Clarify whether the costs for owner-purchased bulk materials will be provided to the consultant for inclusion in the consultant's estimate, or whether these costs will be excluded from the consultant's estimate. Also identify how labor to install owner-purchased bulk materials will be accounted for.

Offsite Fabrication

The owner should specify the execution plan for any shop or other offsite fabrication; or if delegated to the consultant then require the consultant to provide this information for owner review. The owner should specify that the consultant indicate the estimating methodology and pricing basis (i.e., unit rate, by weight, by pipe class, fabricator quotes, etc.) used for offsite fabrication.

Offsite Module Assembly

The owner should specify the execution plan for any offsite module fabrication; or if delegated to the consultant then require the consultant to provide this information for owner review. The owner should specify that the consultant indicate the estimating methodology and pricing basis for offsite module assembly.

Freight

The owner should specify the expectation on how freight costs will be included in the estimate. Typically, freight for process equipment will be identified separately from freight for bulk commodities (as addressed in process equipment above). The owner should require the consultant to identify the pricing basis for freight related to bulk commodities. For international transportation, the consultant should clearly identify plans and costs for air, ocean, and land-based shipping costs, as well as any export preparation, crating, and export duties.

Construction Labor Productivity

The owner should specify that the consultant explicitly identify how labor productivity is determined for each commodity/discipline. This should address issues such as adjustments to base labor productivity for geographical location, labor density, facility complexity, excessive overtime, work week/shifts, weather, labor quality, labor availability, worker facilities (e.g., lockers, washrooms, lunchrooms), location of work areas and support facilities, project conditions (e.g., greenfield, revamp, shutdown), soil conditions, elevated work, and any other conditions affecting labor productivity. The consultant should specify a description of the base labor charts used.

The owner may want to specify that the consultant provide a measure of how the labor productivities and adjustments compare between the current estimate and other similar estimates prepared by the consultant.

Construction Work Week and Overtime

The owner should specify the expectations regarding the construction work week schedules, and use of shifts and overtime; or if delegated to the consultant then require the consultant to provide this information for owner review.

Construction Labor Wage Rates

The owner should specify the expectations regarding union vs. non-union labor, or if delegated to the consultant then require the consultant to provide this information for owner review. The owner should specify to what level construction supervision is to be included in the direct wage rate (e.g., foreman, general foreman, superintendent), or if delegated to the consultant then require the consultant to provide this information for owner review. The owner should specify what items other than wages are to be included in the direct wage rate (e.g., benefits, burdens, small tool allowance, etc.), or if delegated to the consultant then require the consultant to provide this information for owner review.

The owner should specify whether the wage rates used in the estimate should cover direct wages only (with all other indirects identified separately from labor costs), or whether the wage rates used in the estimate should be “all-in” wage rates including allowances for construction indirect costs.

Given the above, the owner should specify that the consultant explicitly identify the build-up of Wage Rates by discipline used in the estimate.

Construction Subcontracts

The owner should specify the expectations regarding the use of construction subcontracts, or if delegated to the consultant then require the consultant to provide this information for owner review. The owner should require that estimated subcontractor hours be identified for construction infrastructure planning and worker density analysis purposes. Subcontractor materials should be identified as owner, contractor, or subcontractor supplied. The owner should specify that the consultant indicate the estimating methodology and pricing basis (i.e., unit price, lump sum quote, etc.) used for each subcontract.

Construction Indirects

The owner should specify that construction indirects be clearly identified (either in the buildup of an “all-in” wage rate) or broken down separately as indicated in the COA. The owner should specify that the consultant provide the quantification and pricing basis for all construction indirects.

It is generally recommended that Construction Indirects not be included in “all-in” wage rates, but be identified and accounted for separately in the COA and the estimate reports.

Commissioning and Start-Up

The owner should specify the strategy and expectations regarding commissioning and start-up costs, and how the costs will be identified in the estimate. The owner should specify that the consultant provide the quantification and pricing basis for all commissioning and start-up costs (not provided by the owner).

The owner should clearly identify how any owner-supplied personnel, equipment, or supplies related to commissioning and start-up should be accounted for. Clarify whether the costs for owner-supplied costs will be provided to the consultant for inclusion in the consultant’s estimate, or whether these costs will be excluded from the consultant’s estimate.

Engineering and Home-Office Costs

The owner should specify the strategy and expectations regarding engineering and home office costs, and how the costs will be identified in the estimate. In particular, the owner should specify if the engineering and home office costs are required to be indicated by phase. The owner should specify that the consultant provide the quantification and pricing basis for all engineering and home office costs (not provided by the owner), including indicating of work week and overtime for engineering and home office personnel. Clarification for costs such as field engineering should be provided to indicate whether they are included in engineering costs or are to be included in construction indirects.

The owner should clearly identify how any owner-supplied personnel or supplies related to engineering and start-up costs should be accounted for. Clarify whether the costs for owner-supplied costs will be provided to the consultant for inclusion in the consultant’s estimate, or whether these costs will be excluded from the consultant’s estimate.

Owner Costs

The owner should clearly identify all owner costs (i.e., owner personnel, owner purchased equipment or other material, owner provided services, etc.) related to the estimate, even if identified in other areas of this document. The owner should clearly identify whether the owner costs will be provided to the consultant for inclusion in the consultant's estimate, or whether these costs will be excluded from the consultant's estimate.

Assumptions, Clarifications, Qualifications

The owner should provide any current assumptions, clarifications, or qualifications that are not addressed elsewhere. The owner should specify that the consultant should provide a list of all assumptions, clarifications, and qualifications used in preparing the estimate in their final Basis of Estimate. The rationale behind any assumptions should be identified.

Exclusions

The owner should provide a listing of all known estimate exclusions (e.g., financing costs, operating spares, recoverable taxes, etc.). The owner should specify that the consultant identify any other items that they believe are not included in the estimate.

Late Changes

The owner should specify how late changes are to be incorporated in the estimate. It is generally recommended to freeze the design for the purposes of estimate preparation, and the owner should address how the costs for any subsequent design changes will be addressed. This process should be integrated with the project change management procedures.

Escalation

The owner should identify the desired "time" basis for the estimate (e.g., 1st Quarter 2013). The owner should specify how escalation through the completion of the project should be calculated and addressed; or if delegated to the consultant then require the consultant to provide this information for owner review.

Risk Analysis and Contingency

The owner should specify the strategy and expectations regarding contingency determination, and how the costs will be identified in the estimate. The owner may request the consultant to

provide a recommended contingency (and supporting cost and schedule risk analysis studies); however it is the owner's responsibility to make the final determination regarding contingency (and other reserve funds).

Benchmarking

The owner should require the consultant to provide a report identifying key benchmarking metrics (e.g., engineering as % of TIC, TIC Costs/Major Equipment Costs, Concrete Hours per CY, etc.), and how the estimate metrics compare with similar projects as part of the final Basis of Estimate document.

Cash Flow

If desired, the owner should require the consultant to provide estimated cash flow information (in tabular form, graphical form, or both). The owner should specify the time interval required (e.g., yearly, quarterly) and the level of categorization to be included.

Summary

Every project estimate is ultimately the owner's responsibility. Owners will often have 3rd party consultants (e.g., engineering, construction contractors, etc.) prepare their project estimate. The owner must take the initiative to be as prescriptive as possible in establishing estimating requirements for the consultants preparing estimates.

This document describes many of the items that should be included in a comprehensive Estimate Requirements Document. The consultant will convert this document to an Estimate Plan; and during preparation of the estimate, the plan becomes a living document that can form the starting point for the consultant's Basis of Estimate Document that should be required to be completed and submitted with the estimate.

References

1. AACE International, Recommended Practice 17R-97, *Cost Estimate Classification System*, AACE International, Morgantown, WV Rev. Nov. 2011.
2. AACE International, Recommended Practice 18R-97, *Cost Estimate Classification System: As Applied in Engineering, Procurement, and Construction for the Process Industries*, AACE International, Morgantown, WV Rev. Nov. 2011.
3. AACE International, Recommended Practice 20R-98, *Project Code of Accounts*, AACE International, Morgantown, WV Rev. Jan. 2003.

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4. AACE International, Recommended Practice 21R-98, *Project Code of Accounts: As Applied in Engineering, Procurement, and Construction for the Process Industries*, AACE International, Morgantown, WV Rev. Jan. 2003.
5. AACE International, Recommended Practice 34R-05, *Basis of Estimate*, AACE International, Morgantown, WV Rev. Jul. 2010.
6. AACE International, Recommended Practice 36R-08, *Development of Cost Estimate Plans - As Applied in Engineering, Procurement, and Construction for the Process Industries*, AACE International, Morgantown, WV Rev. Jun. 2009.



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