BASICS of COST PLANNING & COST ESTIMATE

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COST PLANNING & COST ESTIMATE

- DEFINITIONS, TERMS & PROCESSES
- TYPES OF PRE-CONTRACT COST PLANNING
- FACTORS AFFECTING COST ESTIMATES/PLAN
DEFINITIONS, TERMS & PROCESSES

A. Classification of Areas
B. Terms of Cost Estimate & Cost Plan
C. Pre-Contract Cost Planning Processes
DEFINITIONS, TERMS & PROCESSES

A. CLASSIFICATION OF AREAS

GROSS FLOOR AREA (GFA)
GFA is the area contained within the external walls of the building measured at each floor level (including any floor below the level of the ground), together with the area of balconies and the thickness of external walls (for submission to Planning Authorities).

*Note: Carpark & plant room areas are usually excluded, but this is **not** a fixed rule.*

CONSTRUCTION FLOOR AREA (CFA)
CFA is the covered areas fulfilling the functional requirements of the building measured to the outside face of the external walls or external parameter. Areas occupied by partitions, columns, internal structural walls, bay windows, stairwells, lift shafts, plant rooms, water tanks, carparks, open covered areas and the like are included.
DEFINITIONS, TERMS & PROCESSES

B. TERMS OF COST ESTIMATE & COST PLAN

ELEMENTAL QUANTITY
- No. of door
- Area of wall finishes
- Volume of concrete structure

ELEMENTAL RATIO
- Elemental quantity per CFA
  (i.e. Element Quantity / CFA)

ELEMENTAL UNIT RATE
- Average cost per unit elemental quantity
  (i.e. Total Cost of Element / Elemental Quantity)

INDICES
- Indication of price level for particular subject
  - tender price index
  - building services tender price index
  - labour index
  - material index
  - consolidated labour & material index
### C. PRE-CONTRACT COST PLANNING PROCESSES

<table>
<thead>
<tr>
<th>Stages</th>
<th>Main Purposes</th>
<th>Available Information</th>
<th>Type of Cost Planning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inception &amp; Feasibility</td>
<td>Prepare feasibility studies to determine cost limit / budget</td>
<td>Site location &amp; area; Project details (e.g. type, plot ratio, CFA, height limit)</td>
<td>Preliminary Cost Estimate</td>
</tr>
<tr>
<td>Outline Proposal</td>
<td>Prepare cost estimate &amp; initial cost studies in order to confirm cost limit / budget</td>
<td>Sketch design (e.g. general layout, building shape, no. of storey)</td>
<td>Elemental Cost Estimate</td>
</tr>
<tr>
<td>Scheme Design</td>
<td>Prepare cost plan &amp; detailed cost studies in order to confirm cost limit / budget</td>
<td>Plans, elevations &amp; sections; Framing plans; Foundation information; Finishes level; Building services requirement</td>
<td>Cost Plan</td>
</tr>
<tr>
<td>Design Development</td>
<td>Update cost plan &amp; further cost studies of alternative designs</td>
<td>Alternative design proposal</td>
<td>Revised Cost Plan</td>
</tr>
<tr>
<td>Tender</td>
<td>Cost check of final design</td>
<td>Complete design (i.e. tender / working drawings &amp; specifications)</td>
<td>Pre-Tender Cost Estimate</td>
</tr>
</tbody>
</table>
TYPES OF PRE-CONTRACT COST PLANNING

A. Preliminary Cost Estimate
B. Elemental Cost Estimate
C. Cost Plan
D. Pre-Tender Cost Estimate
E. Reconciliation of Cost Plan
CFA
- Land & development conditions (e.g. site area, plot ratio, site coverage, height limitation & GFA)
- Maximum buildable area = site area x approved plot ratio
- Approx. CFA = site coverage area x no. of floor (for building with full site coverage)
- Approx. CFA = GFA x conversion factor (1.05-1.10 for residential, 1.10-1.20 for office)

Unit Rate
- Location factors
- Specification level
- Construction methods
- Cost analysis of previous similar projects
- Adjustment of price index
TYPES OF PRE-CONTRACT COST PLANNING

A. PRELIMINARY COST ESTIMATE

Total Construction Costs = Functional Area × Functional Rate

Functional parameters

- Hospital = 60m² to 120m² per bed × $A/bed
- Hotel = 55m² to 100m² per room × $B/room
- Auditorium = 1.5m² to 2m² per seat × $C/seat
- Carpark = 30m² to 40m² per carpark × $D/carpark
# TYPES OF PRE-CONTRACT COST PLANNING

## A. PRELIMINARY COST ESTIMATE

*Example of CFA x $/CFA*

<table>
<thead>
<tr>
<th>Element</th>
<th>CFA (m²)</th>
<th>Rate ($/CFA)</th>
<th>Total ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Site Formation</td>
<td>* 130,000</td>
<td>650</td>
<td>84,500,000</td>
</tr>
<tr>
<td>2. Detached House</td>
<td>15,000</td>
<td>14,870</td>
<td>223,050,000</td>
</tr>
<tr>
<td>3. Duplex Houses</td>
<td>7,500</td>
<td>16,670</td>
<td>125,025,000</td>
</tr>
<tr>
<td>4. Apartment Blocks</td>
<td>30,000</td>
<td>12,380</td>
<td>371,400,000</td>
</tr>
<tr>
<td>5. Club House</td>
<td>2,500</td>
<td>12,530</td>
<td>31,325,000</td>
</tr>
<tr>
<td>6. Car Park</td>
<td>8,000</td>
<td>4,470</td>
<td>35,760,000</td>
</tr>
<tr>
<td>7. External Works</td>
<td>** 39,000</td>
<td>750</td>
<td>29,250,000</td>
</tr>
<tr>
<td><strong>Total (as at July 2004 prices)</strong></td>
<td><strong>63,000</strong></td>
<td>14,291</td>
<td><strong>900,310,000</strong></td>
</tr>
</tbody>
</table>

*Note: * Estimated site formation area

** Estimated external work area
B. ELEMENTAL COST ESTIMATE

Total Construction Costs = Sum of (Elemental Quantity \times Elemental Unit Rate)

Standard Elements
- Site preparation: demolition, site formation, site investigation
- Foundation & substructure: piling, basement
- Carcase: structural frame, door, window, curtain wall, shop front, skylight
- Finishings: roof, floor, internal wall, ceiling, external wall
- Fixture & fittings: metal work, built-in furniture, equipment
- Services: sanitary fitting, plumbing, electrical, fire services, HVAC, security, gas, communication, automation, swimming pool filtration plant, sewage, refuse disposal
- Miscellaneous work: external work, landscaping, drainage, utilities connection
- Preliminaries (% allowance)
- Contingencies (% allowance)
B. ELEMENTAL COST ESTIMATE

Elemental Quantity
- Design information (e.g. Architect’s first sketch design)
- Analysis of previous similar projects

Elemental Unit Rate
- Location factors
- Specification level
- Construction methods
- Cost analysis of previous similar projects
- Adjustment of price index

Allowance for
- Preliminaries
- Contingencies
TYPES OF PRE-CONTRACT COST PLANNING

B. ELEMENTAL COST ESTIMATE

Report of Elemental Cost Estimate
• Cover
• Contents
• Summary of cost estimate (exclusions)
• General particulars (project details, definition of area, schedule of area, basis of cost estimate, drawing list)
• Outline specification & assumptions
• Supplementary information
Total Construction Costs = Sum of (Approximate Quantity x Unit Rate)

Standard Elements
- Site preparation: demolition, site formation, site investigation
- Foundation & substructure: piling, basement
- Carcase: structural frame, door, window, curtain wall, shop front, skylight
- Finishings: roof, floor, internal wall, ceiling, external wall
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- Miscellaneous work: external work, landscaping, drainage, utilities connection
- Preliminaries (% allowance)
- Contingencies (% allowance)
TYPES OF PRE-CONTRACT COST PLANNING

C. COST PLAN

Approximate Quantity
• Design information (e.g. drawings & specifications)
• By measurement

Unit Rate
• Supplier’s / Sub-contractor’s quotations
• Recent returned tenders
• Cost analysis of previous similar projects
• Adjustment of price index

Allowance for
• Preliminaries
• Contingencies
D. PRE-TENDER COST ESTIMATE

- Based on B.Q.

- Priced in current unit rates
  - Supplier’s / Sub-contractor’s quotations
  - Recent returned tenders
  - Cost analysis of previous similar projects
  - Adjustment of price index
E. RECONCILIATION OF COST PLAN

- Reflecting change of design / specification
- Cost differences between old & new designs / specification
- Cost saving exercise
- Factors caused cost differences
  - Change in Employer’s requirements
  - Change in development
  - Change in site conditions
  - Change in design
  - Change in specification
  - Change in price indices
E. RECONCILIATION OF COST PLAN

Example

<table>
<thead>
<tr>
<th>Item</th>
<th>($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) Cost Plan No. 1 (as at February 2003 prices)</td>
<td>L</td>
</tr>
</tbody>
</table>

(2) Adjustments

(a) Increase overall building height from A m to B m
   (i) (+) structure [cost of structure \( \times (B - A) \)]
   (ii) (+) architectural feature [cost of architectural feature \( \times (B - A) \)]
   (iii) (+) window [cost of window \( \times (B - A) \)]
   (iv) (+) E & M [cost of E & M \( \times (B - A) \)]
   (v) (+) internal finishes [cost of internal finishes \( \times (B - A) \)]
   (vi) (+) foundation & sub-structure [cost of fdn & substr \( \times 15\% \) (say)]

(b) Allowance for Preliminaries Costs [Total of (a) \( \times 10\% \) (say)]

\[ M \]

(3) Adjustment for Tender Price Index (TPI) \[ N = (L + M) \times (TPI(\text{old}) \times (TPI(\text{new}) - TPI(\text{old})) \]  

Cost Plan No. 2 (as at July 2004 prices) \[ L + M + N \]
Factors affecting Cost Estimate / Plan
Factors affecting Cost Estimate / Plan

- Cost Information
  - Source of cost data
  - Supplier’s / Sub-contractor’s quotations
  - Use of previous cost data
  - Use of previous cost analysis
  - Application of tender price indices
  - Reasonable % allowances
  - Inclusions & exclusions

- Market Information
  - Market conditions (e.g. inflation / deflation etc.)
  - Rapid change of material (e.g. huge increase of structural steel price in 2003)
  - Change of labour costs (e.g. decreasing since 1997)
Factors affecting Cost Estimate / Plan

- Experience of Q.S. / Estimator
  - Senses of build-up rates
  - Senses of elemental unit rate
  - Reasonable assumptions
  - The more expensive elements, the more attention paid
  - Knowledge of construction methods
  - Knowledge of new technologies (e.g. pre-cast façade, steel formwork, light weight concrete internal wall etc.)
  - Knowledge of building regulations
  - Senses of market trend
  - Senses of material costs (Lockhart / Portland Street)
  - Senses of construction related news (e.g.建築廢物堆填費 $27-$125 / ton)
Thank You

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