

Assignment Title – Housing Development

Submission Date – 1st February 2019

BSC Quantity Surveying

Cost Studies of Buildings

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1.0 Introduction

Cost planning is a construction term for Estimation. This has an important role in the pre-construction process to determine the financial impact on Material, Labour and other resource. Cost Planning is a critical stage early on in the pre-construction phase and the purpose of an elemental cost plan is to ensure clients are provided with value for money. They also ensure that clients and designers are aware of the cost associated with a certain design/proposal which can then provide advice to the designer to enable them to amend designs to become more practical to become buildable within a certain budget.

There are different methods of estimating and cost planning which can provide clients, designers and investors a range of different information these are explained below in 1.1.

1.1 What is Cost Planning

As mentioned above, cost planning is vital it is a key part of any construction project whether that be a small self-build or a housing development of 250 new homes. A cost plan or cost estimate will provide a business or a self-builder the knowledge of whether purchasing a certain piece of land is a good investment, by calculating the build cost of plots or single plot, along with any abnormalities that could be associated with the land on which they are looking to purchase. This would give a self-builder confirmation on if the anticipated build is within their budget or if they would then require to reduce the size of the build in order to make it work. For a larger business who wish to purchase a bigger piece of land for a housing development a feasibility cost plan is used for the exact same purpose but to then calculate how much the land can be purchased for in order to produce a certain profit margin. These are the uses of cost planning in the feasibility stage of a project.

Another use for cost plans and estimations is if successful in purchasing land for large development or self-build, the information can then be used for comparative purposes for tenders that have been returned. i.e. When the project has been tendered it is ideal to compare the elements from the cost plan against the tendered elements to ensure the project is coming in within the estimate. From my experience cost plans are usually produced from estimates or rates from previous or similar projects therefore are not 100% accurate but do give a good basis for comparison and an indication on the approximate profit of a project.

Below are the different types of cost plans and estimates that can be produced and the ideal scenarios on where to use each one.

- **Elemental Estimate**

The elemental method of estimation is by far one of the most labour intensive methods. Elemental estimation is an alternative approach for calculating the total estimated cost of building works. (RICS, 2009)

An elemental cost plan follows the rough formula below;

The building works estimate = the sum of elemental targets; and the cost target (for each element) = element unit quantity (EUQ) x Elemental Unit Rate (EUR)

(Tobin, 2018)

This method breaks down the construction into the major elements of building work and provides an estimate for each of these items or as described within NRM1

'Elemental cost planning is a budget distribution technique that is implemented during the design stages of a building project. It involves a critical breakdown of the cost limit for the building(s) into cost targets for each element of the building(s). Cost targets are the recommended expenditure for each element (e.g. substructure, frame, upper floors and roof).

(RICS, 2009)

As mentioned above other important uses for a cost plan for a construction project is for the use at feasibility stage, this can provide vital information for businesses as they can give information as to whether a piece of land is feasible to build on (i.e. if it is worth the investment).

As per all cost plans an estimates assumption are made due to the lack of detail at such an early stage, it is important that any assumptions are stated and also a page of exclusions/qualifications to ensure that information is clearly relayed throughout the cost plan.

If there is more information available at this stage i.e. designs and site investigation reports then it is possible to include a list of abnormal/nonstandard items that will have an impact on the cost of the site, if the information to cost this accurately is unavailable then it can either be taken from previous projects, provisional sum and stated as an assumption or included as an additional cost that may be incurred elsewhere in the cost plan.

Other items that an elemental cost plan may include are things such as professional fees, contingency figures and for longer running projects inflation is important to include.

(Designing Buildings Wiki, 2018) (Designing Buildings Wiki, 2018)

- **Functional Estimate**

The functional method of estimation is a simple form of estimation, it is the method which calculated the costs according to the function of the building. For example, it may be based on the number of car park spaces in a car park or number of rooms in a hotel. There will be cost data associated with this which can then be multiplied by the number proposed to give a very rough estimate. In order to obtain an estimate, Preliminary designs may not be required, but a written brief or specification from the client which states the function and the number of functional elements required should be enough as per the examples above. This method is a good method of estimation for a rough estimation of the likely costs for a building, it is ideal for large complex buildings with no special characteristics. Once a brief has been specified cost data can be retained in the same method as the approximate estimation and then calculated in the following manner;

Functional Estimate = Number of Functional Units (Nr) x Rate for Functional Unit (£/Nr)

- **Approximate Estimate/Floor Area Method**

Approximate/floor area method of estimation is the most popular method for preliminary stage estimating. This method is frequently used for the use of estimating costs in building and housing development. (constructiontuts, 2017). It is possible to get an approximate estimate from basic information shown on the early stage designs. In order to achieve this, you must have either the ability to measure the floor area (m2) of the houses or building that you are completing the estimate for, or the approximate SqFt size of the houses or building. Once you have the quantity of floor area, you must then use cost data from previous projects, this can be obtained via personal records of previous projects that you have been involved with or via the academic publications such as SPONS or BCIS. BCIS and SPONS has the ability to give an approximate rate per M2 for a similar sized construction in the approximate area of the proposed construction. This is vital as you do not want to be producing an approximate cost estimate for a development based in rural Wales based on Construction Rates from Central London as this will not produce a true accurate representation of the cost the client is likely to incur. If there are no nearby construction projects on the BCIS Cost Data then it has the ability to 'rebase' these figures based on location in order to give a more accurate Cost/M2 Rate.

Now the floor area has been determined and an accurate rate obtained from the cost data, the approximate estimate can be obtained by using the following formula.

Approximate Cost Estimate = Floor Area (m2) x Cost Data Rate (£/m2)

This will then give an approximate estimate for that one dwelling, in order to get the approximate estimate for a small development the total will then need to be multiplied by the number of houses/buildings of that size on the development.

2.0 Aim of the Report

I have been appointed by Knight Gardens Housing Development to work on an upcoming project as a chartered surveyor. The role will include producing elemental cost plans and approximate estimations on new developments prior to commencement to ensure that the development schemes are viable to construct.

The purpose of this report is to present my estimations of an upcoming development, that comprises of 9nr dwellings inclusive of all internal finishes & external works. The report will be built up and supported by an elemental cost plan for the proposed development prior to tender and an approximate estimation cost plan that has been requested for comparison purposes when the contract for the works has been issued for tender. In addition to this I have included information regarding possible additional costs associated with the development.

Preliminary designs of this development and house types that have been estimated have been issued by BAM Architects Ltd and are shown in *Appendices 1.0 - 1.7*.

Due to the level of information provided by BAM Architects Ltd there have been assumptions made which are listed below.

2.1 Assumptions Made

At such an early stage in the pre-construction phase where designs and specifications haven't been confirmed, in order to produce a complete cost, plan the estimator must make assumptions. From looking into the designs as shown in the appendix, I have made the following assumptions in order to produce my estimations;

- Site Location Assumed to be greenfield site with minimal ground level changes.
- Plot sizes have been obtained via previous projects and used average areas for 1 Bed and 3 Bed Dwellings.
- Plot construction is assumed to be Timber frame, 102mm Cavity and clad with Red Brick Finished laid in stretcher bond.
- Level of internal completions are to be assumed to be at a median level.

All rates used in order to calculate the estimations of the attached development have been obtained via previous projects that I have personally worked on unless otherwise stated.

2.2 Schedule of Accommodation

Housetype	Area (SqFt)	Area (SqM)	Kitchen	Lounge	Dining	WC	Bedrooms	Cot Room	Bathroom(s)	Ensuite(s)	Study
A	1,150	106.83	1	1	1	1	3	0	1	2	1
No on Site = 6	6,900	640.98	6	6	6	6	18	0	6	12	6

Housetype	Area (SqFt)	Area (SqM)	Kitchen	Lounge	Dining	WC	Bedrooms	Cot Room	Bathroom(s)	Ensuite(s)	Study
B	764	70.977	1	1	0	1	1	1	1	0	0
No on Site = 3	2,292	212.931	3	3	0	3	3	3	3	0	0

2.3 Estimated Build Cost

The cost plan below has been produced in order to give an indicative idea as to what the costs are likely to be to construct the 9nr dwellings on the attached plans. Please note these costs are only for constructing the substructure to the internal completions of the plots. No external works to the site have been included in this estimated build cost.

This estimated build cost is based on the approximate/floor area method of estimation as mentioned in assumptions above.

Housetype	Area (M2)	Rate (£/M2)	Unit Cost (£)	Total Cost (£)
A	106.83	£849.20	£90,720.04	
No on Site = 6	640.98			£544,320.22
B	70.977	£929.29	£65,958.21	
No on Site = 3	212.931			£197,874.64
Total GIFA (M2)	853.90	Total Estimated Cost (£)		£742,194.85

Information Sourced from previous projects I have worked on in South Wales

2.4 Approximate Estimate - Cost Plan

Whilst out for tender I have been requested to create an approximate cost plan for the development for comparative purposes when contractors' tenders are returned. As stipulated in the Elemental Cost Structure of the NRM 1 the approximate estimate will be summarised under the following headings;

Substructure
Superstructure
Internal Finishes
Fittings, Furnishings and Equipment
Services
External Works
Prelims, Fees and Contingency

A full breakdown of the elemental cost plan can be found in *Appendix 2.1*

Elemental Cost Plan

REVISION: A

		M2	
		853.90	
		Total Site Size	
Item		Element Rate (£m2)	Element Cost (£)
1.0	SUBSTRUCTURE		
	Substructure - Excavation of foundation - 600mm in depth by 300mm in width, and disposal of arisings. Pour of 300mm depth of concrete strip foundation, form cavity and construct foundation blockwork up to DPC Level along with block and beam floor slab.	£ 182.25	£ 155,623.28
	ELEMENT TOTAL - SUBSTRUCTURE	£ 182.25	£ 155,623.28
2.0	SUPERSTRUCTURE		
2.1	External Walls - construction of insulated timberframe, (Inclusive of joists and trusses) clad with single skin brickwork.	£ 221.13	£ 188,824.54
2.2	Roof - Felt and timber batten to roof trusses and roof coverings to be slate. Inclusive of all fascias, soffits, low levels, flat roofs, leadwork and dorma's.	£ 50.78	£ 43,357.72
2.3	Internal Walls, Partitions - Timber stud walls and load bearing walls	£ 49.86	£ 42,571.38
2.4	Windows & Doors - uPVC Windows, External Doors, Patio Doors.	£ 82.12	£ 70,124.39
2.5	Scaffolding - All labour, plant and materials for erection of scaffolding to provide a safe working platform for superstructure works	£ 27.06	£ 23,108.50
	ELEMENT TOTAL - SUPERSTRUCTURE	£ 430.95	£ 367,986.53

3.0	INTERNAL FINISHES			
3.1	ELECTRICIAN	£	27.27	£ 23,284.93
3.2	DRYLINING	£	72.99	£ 62,325.54
3.3	2nd fix carpentry	£	28.11	£ 24,002.55
3.4	Final Fix Carpentry	£	3.63	£ 3,102.23
3.5	DECORATION	£	17.35	£ 14,817.39
3.6	INSULATION	£	7.63	£ 6,514.08
3.7	WALL TILING	£	8.41	£ 7,178.09
3.8	Mastic Pointing/Sealant Works	£	2.34	£ 1,994.27
ELEMENT TOTAL - INTERNAL FINISHES		£	167.72	£ 143,219.09
4.0	Fittings, Furnishings and Equipment			
4.1	Kitchens	£	55.88	£ 47,713.16
4.2	Appliances	£	5.87	£ 5,009.17
4.3	Plot Cleaning	£	4.34	£ 3,705.93
4.4	Flooring	£	15.21	£ 12,985.52
ELEMENT TOTAL - FITTINGS, FURNISHING		£	249.01	£ 69,413.77
5.0	SERVICES			
5.1	Mechanical & Plumbing	£	62.43	£ 53,306.81
ELEMENT TOTAL - SERVICES		£	62.43	£ 53,306.81
		Build Rate		Build Cost
TOTAL BUILD COST EXCLUDING, PRELIMS, PROF FEES, EXTENRALS &		£	919.73	£ 785,358.62

Gross External Area assumed as per Brief - 2236 M2

6.0	EXTERNAL WORKS			
6.1	As Appendix 2.2	£	124.20	£ 277,711.20
ELEMENT TOTAL - SERVICES		£	124.20	£ 277,711.20
Prelims, Fees, Contingency				
Contractors Prelims - Site set up and works		20%	£	212,613.96
Profesional Fees - Architects, Management Costs, Site Supervision		7%	£	74,414.89
CONTINGENCY		5%	£	53,153.49
TOTAL CONSTRUCTION COST				£ 1,403,252.16

All information sourced from previous projects.

2.5 Additional Costs

Due to the reduced information on designs (Appendix 1.0) it is difficult to include everything within the elemental cost plan. There are several things which are unavailable for costing until possibly full tender stage, or in some instances unknown until site commencement, but it is worth addressing at this early stage so that the contractor and client are aware. These unforeseen costs that could incur can be managed from the contingency pot that is included in the cost plan in appendix 2.1. A list and description to possible additional and unforeseen costs are shown below;

Pre-Commencement Costs

Unforeseen costs in pre-commencement or professional fees are elements that add to the total unforeseen costs of the job. These could consist of;

- Increased architect fees – due to design changes
- Planning amendments
- Insurances
- Utilities
- Social Contribution Fees
- Extra Site Investigation Fees

Other major factors that could have an affect on the overall cost of the job are as follows below;

Tree Protection – Protection of old trees on a greenfield site is critical and part of planning conditions on some sites. This means that either rare tree types or old trees and their roots must not be damaged during the construction phase, therefore in order to minimise the risk the contractor must provide a form of protection to prevent damage. There is a risk associated with this if it is not protected correctly then the local authority has the rights to sanction fines for the breach of planning conditions.

Extra Dig & Cart away – Without a sufficient ground investigation at Elemental Cost Planning stage it is unknown to what depth the foundation must be. In order to get an accurate depth site investigation studies must be undertaken and a foundation assessment must be produced by an engineer, without this information it has been assumed that a standard 600mm x 300mm foundation will be constructed, but if the ground conditions are poor then a deeper dig resulting in extra cart away and even extra concrete pour will be required meaning that a large sum of money could be lost in the substructure without the adequate information.

Increased foundations – As above without the relevant site conditions report we are left with the risk that we may need to amend the foundation type this could be raft foundations or even piled foundations. If this is required, then for Raft Foundations it would be within the region of £55 per SqM Extra Over for substructure.

Radon Protection – Most land in the UK in particularly in the South Wales area is now at risk of exposure from Radon Gas which is a naturally occurring gas which is mostly present in granite rock conditions but also found in smaller levels elsewhere. If the site is in one of these locations, then a radon protection membrane will need to be designed and fitted into the amended substructure. This would come as an approximate extra over cost of £500 - £600 a plot.

Demolition & Asbestos in ground – It is difficult to find a piece of land these days that hasn't seen some form of construction, there are risks of old building foundations within the ground or an old structure that will be required to be demolished and removed from site which could come with increased costs. Another major element that is associated with demolition of old buildings is asbestos, most old buildings are full of asbestos which would make the demolition a much costlier and time-consuming process.

Screen walls – From the site layout in appendix 1.0-1.7 it is shown that the plots have some Screenwalls, these would usually consist of a shallow strip foundation with a double skin brick construction to 1.8m high. Without the correct details or drawings to scale it is difficult to cost for these but with more of a detail and the specification as above these should be priced at approximately £415 - £430 per Metre. It is important to include for this as a provisional sum if the total is unknown just to be on the safe side.

Underbuild & Retaining Walls – As above without sufficient site investigation or engineering and topographical drawings it is difficult to see the contours of the ground, a steep or even a site with changing levels will require some form of retaining structures or Underbuild on the plots, these can vary from 450mm to 3000mm or higher. Dependent on depth the rate will fluctuate, anything from £75 per Metre to above £500 per Metre for the deeper the Underbuild or retaining wall structure.

3.0 Bibliography

BCIS, 2012. *Elemental Standard Form of Cost Analysis - 4th (NRM) Edition*. [Online]

Available at: <https://www.rics.org/globalassets/rics-website/media/products/data-products/bcis-construction/bcis-elemental-standard-form-cost-analysis-4th-nrm-edition-2012.pdf>

[Accessed January 2019].

constructiontuts, 2017. *Superficial Floor Area Method Estimating*. [Online]

Available at: <https://www.constructiontuts.com/superficial-floor-area-method-estimating/>

[Accessed January 2019].

Designing Buildings Wiki, 2018. *Elemental Cost Plan for Design and Construction*. [Online]

Available at:

https://www.designingbuildings.co.uk/wiki/Elemental_cost_plan_for_design_and_construction

[Accessed January 2019].

Ostrowski, S. D., 2013. *Estimating and Cost Planning Using the New Rules of Measurement*. Chichester: John Wiley & Sons, Ltd.

Radon.com, 2018. *Radon Fact Sheet*. [Online]

Available at: https://www.radon.com/radon_facts/

[Accessed 2019].

RICS, 2009. *RICS New Rules of Measurement*. cOVENTRY: RICS.

Tobin, D. N. Y., 2018. *Estimating Using NRM 1 (Order of Estimate)*. Swansea: s.n.

3.1 Appendices

To be attached here with hard copy