Chapter 5

Appraisal of design to determine viability of development schemes

Herbert Robinson

1. Introduction

Appraisal is essential to ensure that the financial, economic, social or environmental implications of a design or alternative design solutions are known at the beginning to establish whether to build or not, to modify a design or simply to progress to the next stage of the development process. This chapter focuses on the economic appraisal of design based on the analysis of key variables and their impact on costs and benefits at different time periods during the lifecycle of a project. Key variables include land cost, yield, building cost, planning, professional fees, marketing costs and interest rates and their effects on profitability and value of a scheme.

There are various methods used for the appraisal of design. This chapter examines the principles of design appraisal using examples of a discounted cash flow (DCF) technique and non-discounted method called the residual valuation method to explore the implications of design variables on project costs and development value. For example, the discounting method is based on (1) predicting costs and income/benefits over the life cycle of the project, (2) identifying an appropriate discount rate and (3) discounting all cash flows to their present value. The chapter examines the.

2. Assessing costs and benefits of design alternatives

The factors affecting design costs and benefits, and their implications in terms of capital costs have been discussed extensively in chapter 2. Using the design costs and benefits matrix (reproduced in table 1.) below); various design alternatives and associated design variables can be explored to determine the best solution.

Table 1: Design costs and benefits matrix

COSTS	BENEFITS/ VALUE
Easy-to-Price Costs **Economic – land, planning, design cost, construction cost**	**Easy-to-Price Benefits** **Economic – asset value, rental or sale income, normal and enhanced capital allowances**
Not-so-easy to price Costs **Environment - pollution (emission cost), carbon cost, scenic values lost etc.** **Economic – operation cost, insurance cost, loss of property value etc.**	**Not-so-easy-to-price Benefits** **Social – staff morale, comfort, etc.** **Economic – productivity, hospital recovery rates, savings in staff costs etc.** **Environmental – savings in energy,**

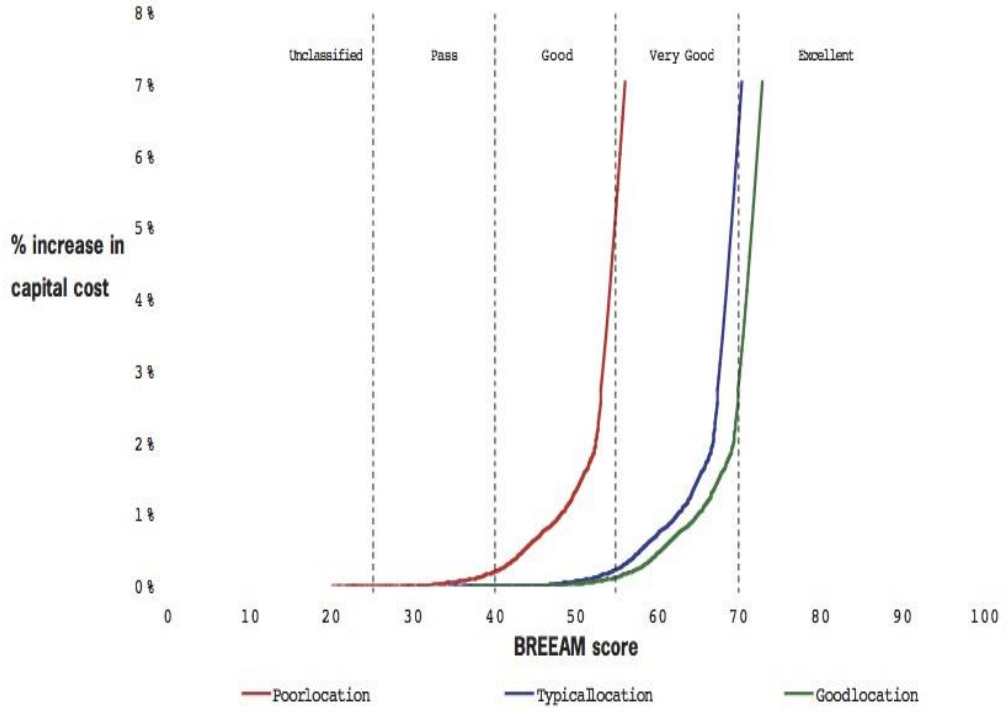
Some costs such as land, planning, design and construction costs and benefits such as rental income, sales income and asset value are easily assessed during the development process and/or when a development is completed. Other costs can be determined indirectly or directly through regulations such as charges, taxes, fees for planning permission and building

regulations. It is also recognized in chapter 2 that there are categories of costs and benefits that are too difficult to price or quantify (e.g. savings as result of reduced carbon emissions, flooding damage, and productivity), social and environment costs (e.g. noise and air pollution, and traffic congestion). Appraisal involves the identification and analysis of various costs and benefits occurring at different time periods during the lifecycle of a project. In the appraisal of design, specific priorities are established by a client such as for example, to reduce waste, savings in energy, reducing insurance costs associated with flooding, conserve resources by using recycled, recyclable or energy efficient technologies to minimise energy consumption.

The climate change and sustainability agenda reflects a move from traditional approach of appraisal focusing on the economic dimension to an inclusive approach including social and environmental costs. The total cost associated with any project is the sum of the project's economic, social and environmental costs and the same approach is adopted for benefit assessment. These developments have provided the momentum to consider the social and the environmental costs of alternative design using assessment tools such as BREEAM and LEED (discussed in chapter 12) and various valuation methods to assess social impact (Gilchrist and Allouche, 2005).

The BREEAM rating/score is a trade-off between economic and environmental costs of a design. According to Nick Hayes, Head of sustainability at EC Harris Built Environment Consultancy failure to consider the impact of achieving the desired BREEAM rating in the early design stages *(RIBA Stage A to C)* can lead to key credits becoming unobtainable, which can have a negative impact on design, and subsequent economic and environmental costs. Hayes further argued that after outline design is completed, the credits available reduce by up to 30%. Various studies have shown that to achieve an increase in BREEAM rating, an uplift in cost is required which varies from one standard to another.

Figure 1: Cost of achieving various BREEAM standards



BRE and Cyril Sweet, 2005

A BRE information paper (BRE and Cyril Sweet, 2005) indicated that to obtain a BREEAM Excellent rating in offices, construction costs are expected to increase by 3.3% for a good location or 7.0% for a typical location (See figure 1 above). Another case study of three office buildings carried out by Halcrow supported by Davis Langdon and Cyril Sweet shows that the additional cost for achieving BREEAM Excellent range from 4.6 to 7.4% (Halcrow *et al*, 2010). CBRE (2009) also noted that development of a greener building designed to achieve one of the higher standards of accreditation is likely to add between 5% and 7.5% to construction costs. The study concluded that 'even the ambition of producing a zero-carbon development – which is more demanding than even the highest levels of BREEAM or LEED accreditation – would potentially add less than 15% to development costs". However, BRE reported that the development of Campus M Business Park, a high profile office and technology park in the eastern district of Munich, built by AIG/Lincoln, achieved a BREEAM Excellent rating at no extra capital cost.

The variations in the cost of BREEAM compliance suggest that considerable care is required in determining the additional costs for BREEAM compliance in the appraisal of design. Whether there are additional costs or not for BREEAM compliance, the outcome could result in reduced operational cost due to lower energy usage, enhanced capital allowances and other tax advantages. There could also be reduced costs associated with void as well as the opportunities for significantly higher rental returns or sale income. For example, BRE reported a case study of Bletchley Leisure Centre, Milton Keynes in 2010 which "achieved BREEAM Excellent" and provided a significant reduction in running costs helping the Council to save over £3 million in revenue funding during a 15 year period.

The social cost of construction projects can also be assessed. In the UK some social costs are incorporated by statute within the Department for Communities and Local Government (2013). For example, the planning obligations (s106 T&CPA 1990 *as amended*) and payments arising from Community Infrastructure Levy (s206 Planning Act 2008) are used to ensure that project owners contribute to the additional social costs (and environmental costs) arising as a result of the pressure for extra social and economic infrastructure created by new development projects.

3. Appraisal of Design using Discounting Methods

For any design, some costs (whether economic, social or environmental) are incurred at the beginning whilst others including benefits such as rental and sales income are realized at a later stage when a development is completed. Discounting methods addresses the problem relating to costs and benefit streams of a project occurring at different time periods. Examples of discounting methods are Net Present Value (NPV), Internal Rate of Return (IRR) and Whole Life Costing (discussed in chapter 8). Discounting technique examines how much an investment today will be worth in the future. This will depend on one's perception of demand, inflation and uncertainty. The fundamental question is illustrated by asking what will be today's value of £1,000,000 received in ten years' time. The reverse question is how much you would need to invest today to realise £1,000,000 in ten years which can be determined by applying compound interest.

The value £100 today is not the same as £100 in five year's time. Time value allows for costs and benefits at different time periods to be translated to a single equivalent monetary value and

interest rates allow for comparisons to be made between design alternatives. Time value reflects the cost of capital or the opportunity cost of capital and it is not the same for everyone. For the bank lending money to the developer, interest rate is the compensation for loss of earnings. For example, if a developer borrowed £10 million with an agreed interest of 10%, the amount to be paid after 12 months will be £11 million. In the example above, £10 million is the principal and £1million is the interest. There are different types of interest. In simple interest, only the original capital earns interest. In compound interest, interest accrues on the original capital as well as the interest in the previous time period. Interest can also be compounded several or many times within a year such as monthly, weekly or daily. For example, if a developer borrowed £100 million from the bank with an agreement to pay 5%, the payments due under the two different interest regime are shown in the table below.

Table 2: Simple and Compound Interest

Year	**Cost**	**Simple Interest Factor**	Value	**Compound interest factor**	Value
Year 0	100				
After 1 year	100	(1.05)	£105 million	(1.05)	£105
After 2 years	100	(1.05)	£105 million	(1.1025)	£110.25

Compounding allows for the way a present sum of money will grow over time. For example, £100 million will grow to £110.25 in 2 years time given an interest rate of 5%. The compound formula is $(1+r)^n$ where *r* is the cost of capital or interest rate and *n* is the number of years.

Table 3: Discount Factor

Year	**Cost**	**Discount Factor (5%)**	**Values**
0	100		
1	100	0.9524	95.24
2	100	0.9070	90.70

Discounting is the reverse of compounding – how much a future sum of money would be worth today. The discount formula is $1/(1+r)^n$ and in the example above, it means you need to invest £90.70 today to generate £100 in two years' time. Similarly, £95.24 can be invested today to generate £100 in a year's time. Thus £1,000,000 received in 10 years time assuming a discount rate of 10% will be the equivalent value of £385,544 received in cash today. The relationship between present value and future value is illustrated below.

Present value (PV) = $1/(1+r)^n$ x Future value (FV)

Future value of cash flow (FV) = PV $(1+r)^n$

Where PV = Present value of cash flow
r = Interest rate
n = Number of years

Hence £1,000,000 = PV $(1+r)^n$

Where r = 10% and n =10 years

Present value (PV) of £1,000,000 = £385,544

However, it is highly unlikely that interest rates will remain the same, due primarily to uncertainties. Thus the selected interest rate reflects a view of the future and the uncertainties associated with a particular project. This principle can be applied by estimating annual cash flow for each year of a project, comprising of Capital Expenses (CE), Operating Expenses (OE) and Revenue Income (RI). Since resources expended and income gained will be accruing annually, each year's cash flow will need to be adjusted according to the discount factor for that year. Assuming a project to have an estimated Capital Expense (CE) of £98.5 million over a design and construct period of 5 years, this expenditure can be expressed as a series of annual budgets. Similarly the operating period of 9 years can be expressed in the same manner using Operating Expenses (OE) and Revenue Income (RI).

It is essential that correct decisions are taken at the design stage when the cost of making changes is relatively small and the potential to make improvements is high. Therefore all possible options should be considered and the best possible design solution selected to meet the client requirements. Table 5 illustrates a comparison between two design alternatives with annual discounted cash flow taken through the period of the whole project. The calculation does not allow for the deduction of tax on revenue. The discount rate is set at 10% which reflects the cost of capital or the minimum acceptable rate of return. Design A generates a cumulative NPV of £96.25 million, thus the project returns a shortfall of £2.25 million compared with the capital expense of £98.5 million. Design B incurs additional capital cost, however operating expenditure is less and there is the added benefit of the design and construction period being reduced to 4 years, thereby providing an additional year's income. Taking these factors into account the cumulative NPV increases to £122.165 million which exceeds the £105 million capital expenditure by £17.17 million. Investment in Design B generates a greater return. Assuming that there are no other factors to be taken into account then it is reasonable to conclude that Design B offers a better proposition, given that it produces a further £17.165 million above the NPV discounted at 10%.With Net Present Value (NPV) which measures all cash-flows over the duration of the project, and then discounted to the present, projects are selected <u>if</u> NPV > 0. The Internal Rate of Return (IRR) is the discount rate that results in a Net Present Value (NPV) of zero. In general projects are selected if IRR is greater than the cost of capital. The Net Terminal Value (cash flow) approach uses a compound factor (instead of a discount factor). Using the NTV and NPV approaches result in the same decisions in terms of the choice between design A and B. The figures are only different because they are located at different points in time.

Table 4: Terminal Values

Year	Cost	Income	Compound interest factor	Terminal Values

Table 5

DESIGN A	**Design and Build**						**Operate**								
Year	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**
Capital Expense (CE)	(-98.5)														
- Cash Flow		(-5)	(-4.5)	(-26)	(-35)	(-28)									
Operating Expense (OE)							-15	-15	-15	-15	-15	-15	-15	-15	-15
Revenue Income (RI)							30	40	45	45	45	45	45	45	45
Gross Revenue*							15	25	30	30	30	30	30	30	30
Discount Rate 10%	1	0.9091	0.8264	0.7513	0.683	0.6209	0.5645	0.5132	0.4665	0.4241	0.3856	0.3505	0.3186	0.2897	0.2633
NPV							8.4675	12.83	13.995	12.723	11.568	10.515	9.558	8.691	7.899
CUM NPV							8.4675	21.2975	35.2925	48.0155	59.5835	70.0985	79.6565	88.3475	96.2465
Project Capital Expense (CE)		£98.5 million													
Total Operating Expenses (OE)		£135 million													
Total Revenue Income (RI)		£385 million													
Discount Rate		10%													
Project NPV shortfall		Shortfall £2.2535 million													

DESIGN B	**Design and Build**					**Operate**									
Year	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**
Capital Expense (CE)	(-105)														
- Cash Flow		(-7)	(-18)	(-45)	(-35)										
Operating Expense (OE)						-13	-13	-13	-13	-13	-13	-13	-13	-13	-13
Revenue Income (RI)						30	40	45	45	45	45	45	45	45	45
Gross Revenue*						17	27	32	32	32	32	32	32	32	32
Discount Rate 10%	1	0.9091	0.8264	0.7513	0.683	0.6209	0.5645	0.5132	0.4665	0.4241	0.3856	0.3505	0.3186	0.2897	0.2633
NPV						10.5553	15.2415	16.4224	14.928	13.5712	12.3392	11.216	10.1952	9.2704	8.4256
CUM NPV						10.5553	25.7968	42.2192	57.1472	70.7184	83.0576	94.2736	104.4688	113.7392	122.1648
* Tax liability not deducted															
Project Capital Expense (CE)		£105 million													
Total Operating Expenses (OE)		£130 million													
Total Revenue Income (RI)		£430 million													
Discount Rate		10%													
Project exceeds NPV by		£17.1648 million													

Table 7.1 Infrastructure Designs A & B

3. Appraisal of Design using Residual Technique

Residual valuation technique is an example of non-discounting method for considering investment proposals and establishing project feasibility. It depends mainly on two factors, development value and development costs. The main purpose is to ensure that the cost of development is reasonable and there is a satisfactory return or benefits. The method is used to determine Residual Profit and Residual Land Value as shown below.

Residual Profit = Development Value – Development Cost (1)
Residual Profit = Dev. Value – (Land Cost + Cons Cost*) (2)
Residual Land Value = Dev. Value – (Cons Cost* + Profit)

*Construction and associated costs include professional fees, planning, interest charges on building costs and professional fees.

According to the RICS valuation information paper (VIP) 12, the residual method recognises that the value of a development scheme is a function of a number of elements:

- Value of the completed development (gross development value (GDV),
- Direct costs of developing the property (gross development cost (GDC),
- Return to the developer for taking the development risk,
- Cost of any planning obligations and
- Cost or value of the site

The development cost establishes all expenditures incurred including financing costs and interest charges. The development value establishes the benefit to the developer in financial terms but a key question is how to quantify the value? There are two key variables required to establish a scheme's value which are (1) income or the rent – amount of money a tenant is likely to pay to occupy the proposed development and (2) investment yield used to discount future income stream to calculate the capital value of the scheme today.

Capital Value (or Development Value) = Rent x 100/yield (%)

3.1 Establishing Rental Values

The amount of rent (income) is determined by the relationship between demand and supply of different types of property. The key variables affecting rental income are as follows:

Demand - investment and occupation demand
Market segmentation – location, types or uses
Labour markets – services, industry, retail etc.
Population – demographic trend, growth rate etc.
Regulations and laws – land use, taxation etc.

Establishing rental income is based on rules for measuring areas (e.g. RICS Code of Measuring Practice) using rates per square foot or metre. This is usually expressed as net lettable area (e.g. office), gross internal area (e.g. industrial), and zones (e.g. retail units). The rent can also be determined by comparable evidence of recent lettings of similar schemes in the location and making adjustments for differences in age, quality, specification and market trends such as the growth of green buildings. There are other factors to consider such as the balance of current supply between new or refurbished versus second-hand space, current climate and surrounding markets. Strong demand and modest completion of speculative space can combine to force down the vacancy rate for quality space. Judgements therefore have to

be made in difficult and unpredictable economic climate whether to build in anticipation that there will be a significant reward in future when economic conditions improve or become favourable. Surrounding markets have a huge influence on rental levels. For example, average central London prime rents continued to rise as rents in both the City and West End markets reached their highest levels since 2008.

In terms of the rental value of green or sustainable buildings, there is still a considerable debate. According to Geoffrey Steward of SGBA Limited, the benefits of green buildings include a reduction in operating costs (7-9%), increase occupancy by 3.5%, increased building value by 7.5% and an increase in rental by 3%. CBRE (2009) study concluded that "there are a number of unresolved issues in assessing the scale and source of payback for incurring these additional costs, particularly in terms of investment value and pricing". They further stated that evidence on rental transactions indicates that "green buildings achieve a rental premium similar in proportion to the scale of additional development costs for mid-range levels of certification". The authors argued that the "future accumulation of evidence on the relative rent levels, running costs and, in due course, investment prices, of green over conventional buildings, will reinforce these market differentials".

3.2 Establishing Yield

Yield is a term widely used in stock market transactions to compare totally different stocks with one another. An interest in property is no different from an interest in any other form of investment. Establishing property yield involves analysing the sales of comparable properties to the proposed development and making adjustments to reflect investors' perception of future rental growth against the risk of future uncertainty. Freehold properties are deemed to produce a perpetual income, for the purposes of valuation. As with shares or any other form of investment, this income may vary considerably in time. Currently acceptable yields for various property types are determined by the market. Higher yields are used to reflect greater perceived risks or are associated with additional risks in participating in a development.

HIGH YIELDS = GREATER perceived risks/problems LOW YEILDS = SMALLER the Perceived risks/problems.

100/yield (%) = Years Purchase (YP) Factor

Years Purchase (YP) value is simply the expression of an investor's expected return. Thus should an investor expect a return of 15% on an investment in a house to rent, then the YP is equal to 100/15 = 6.67

HIGH YIELDS= LOW Capital Values 10% Yield means the multiplier is 10YP LOW YEILDS= HIGH Capital Values 5%Yield means the multiplier is 20 YP

Yields are affected by risk of loss of capital, loss or irregularity of income and are influenced by liquidity of investment, cost of transfers (sales and purchase) and management of property. For example within each category, it is possible to detect a wide range of yields according to the factors affecting specific property categories. However, location, both in terms of geographical and locality, provide the most important determinant of yields.

Property yield has a relationship with general investment yields (other non-property assets e.g. money, bonds, shares). The key variables affecting yield are as follows:

Asset preferences – portfolio of assets depends on balance between liquidity and yield
Cost of switching – ease and cost associated with changing from one asset to another (e.g. cost of property purchases and sales)
Risks – balance between income certainty and capital gains

4. Case Study of the Blackfriars Development Project

A developer is interested in purchasing land for the Blackfriars Road Development Project, in the South Bank Area in London SE1 and intends to submit a planning application for a proposed development. The company requires a feasibility/profitability assessment of the proposed development. The proposed development will be of a high specification design to maximise the potential rental income, and aims to achieve a Lettable Floor Area of 85% of Gross Internal Floor Area.

4.1 Assessing the viability of a development scheme

For any development, it is important to do a thorough site survey and viability assessment with all assumptions clearly stated to complete the appraisal of the proposed development. According to the RICS Guidance Note on financial viability in planning (RICS, 2012), a proper assessment is required to ensure the following:

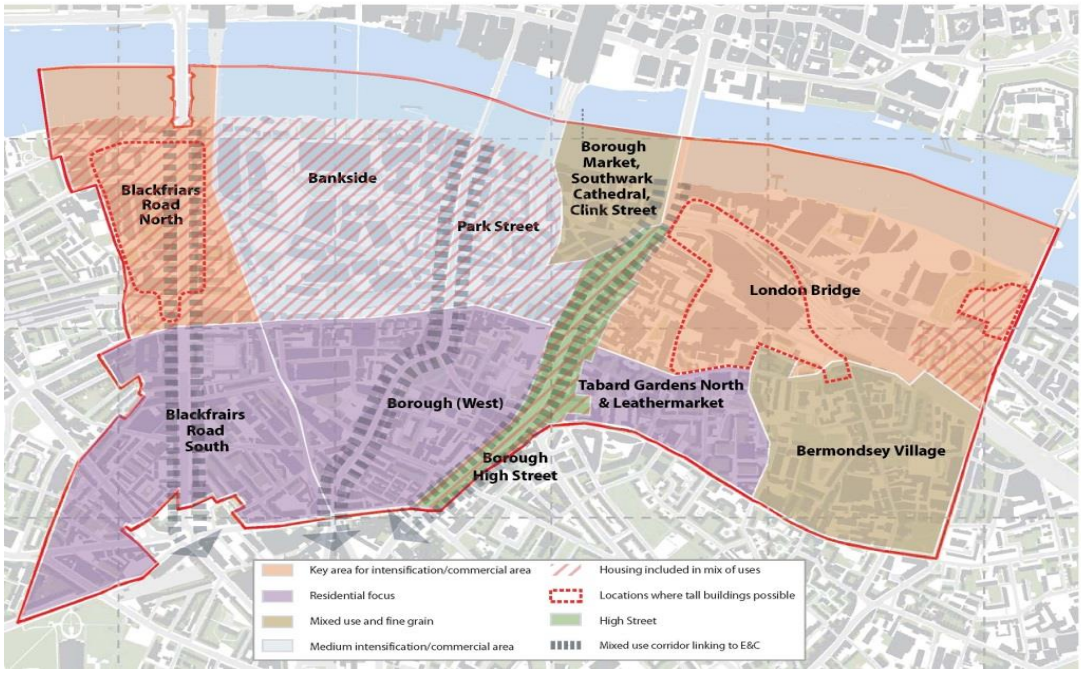
(1) land is appropriate and can be released for development;
(2) developers are capable of obtaining an appropriate market risk adjusted return for delivering the proposed development;
(3) proposed development is capable of securing funding.

It is crucial to explore the planning obligation liabilities to assess how they will adversely affect the site value to the landowner and return to the developer. If these conditions are not favorable, the land is not likely to be available and the development will not take place as it will not be profitable.

4.2 Assessing the Development Location and Site

Southwark will benefit significantly due to The Shard and other high profile developments in the surrounding areas. There is a current plan over the next 15 years to create an *'extraordinary world city quarter containing successful business districts, sustainable residential neighborhoods and world class services.'* (Southwark Council, 2010). See figure 2 for the South Bank Development Plan showing Southwark Council's approach to change in Bankside, Borough and London Bridge.

Figure 2: South Bank Development Plan
Southwark Council Approach to change in Bankside, Borough and London Bridge

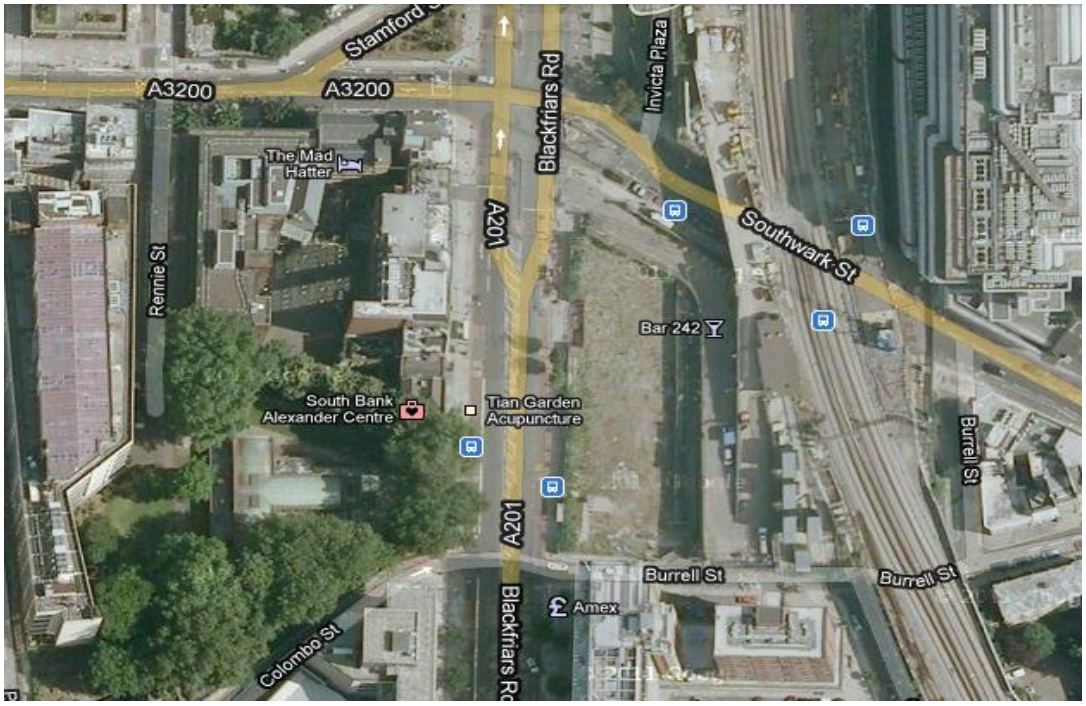


Source: Southwark Council

Regeneration around Southwark consisted of £1.5 billion Elephant and Castle regeneration programme, major redevelopment projects at Canada Water, Bermondsey Spa and Bermondsey Square, the Peckham Programme, with recent regeneration at Borough and Bankside.

Demand for investment is growing because the Southwark market is characterised by a lack of modern, good quality developments. The demand for commercial space is relatively good, with demand for higher quality space significantly outweighing supply. There has been a considerable pressure for good quality land for development in London due to increasing competition, particularly for larger high quality floor spaces in the traditional ‘core’ locations. This has prompted occupiers and tenants to search further for good value. The business case for companies to remain within the ‘Square Mile’ is strong creating a shift towards Southwark and good quality fringe locations (see figure 3 showing the area where the Blackfriars development project is located). Blackfriars Station's new south entrance will improve transport links.

Figure 3: Development site



The development site should be thoroughly appraised (see example of a land ready for development in figure 4). The RICS Guidance Note (RICS,) stated that "viability appraisals may be used in connection with a number of issues in respect of both planning policy and development control". Some of the issues include:

assessing the nature and level of planning obligation contributions/requirements;
the timing of planning obligations contributions;
applications for enabling development;
reviewing land uses;
dealing with heritage assets and conservation;
formulating planning policy through core strategies (local development frameworks and plans

Figure 4: Land for Development

The RICS Guidance Note also acknowledged that the variables used in the appraisal (see Table 6) may change over time and will reflect the movement in the property market generally.

4.3 Establishing Development Costs

The direct costs for development often includes construction and associated costs such as professional fees, planning and building regulation fees, interest charges and other costs associated with using or disposing a building (see Table 6).

Table 6: The key variables in establishing development costs

- Land costs – price of land, stamp duty, legal fees, agents fees (e.g. 1-2%)
- Site costs – ground investigation and land survey fees
- Building costs – Based on the gross area of the building and price per square metre (e.g. single rate methods such as superficial area method for initial appraisals and other multiple rate methods (e.g. elemental cost plan and approximate estimating as appropriate)
- Professional/management fees – usually based on a percentage of the building costs or a scale of charges, negotiated or fixed fee for each profession involved
- Planning fees - costs involved in making planning applications and securing consent
- Building regulation fees – scale of charges depending on the building cost or size (Building Control Department)
- Funding fees – incurred for arranging finance and usually reflects the size of the loan
- Finance/ interest charges – cost of borrowing money or opportunity cost (interest on land costs, professional fees and building costs)
- Letting fees – usually varies as a percentage of rental value
- Sales costs - include agent's and solicitors fee (usually a percentage of Net Development Value)
- Other development costs (e.g. relocation, planning agreements such as section 106 planning agreement, commissioning, taxation etc)

There are well established (and sometimes sophisticated) methods to determine variables such as Lettable Floor Area, building costs, construction duration, professional fees and other costs.

4.4 Establishing Building Costs

To estimate the building cost, analysis of similar and comparable development is required. An Elemental Analysis of similar development can be taken from a variety of sources (Table 7) such as from company project database, external sources such as BCIS, building magazine and architects journal. Other sources could be used such as price books (e.g. Spons, Wessex and Griffiths), and sub-contractors' prices to determine and adjust building costs depending on the estimating technique used.

Table 7: Examples of Sources of Building Cost

Source A:	BCIS Online
Source B:	Building.co.uk; High Spec; eleven storey office building
Source C:	Company Database e.g. Davis Langdon Cost Model
Source D:	Architects Journal; City of London office developments
Source E	Price Books e.g. Spons, Wessex, Griffith

The choice of design in the form of materials selected to reduce embodied energy, orientation of building, geometry and height of building, use of renewable systems, minimising waste, use of recycling materials and the application of environmental assessment techniques such as BREEAM will affect the cost. The examples selected should therefore be the best matched with the proposed project in terms of specification, scope and scale.

First, from the analysis of each comparable project, indices for time, location and quality can then be applied to adjust the building costs. Time and location indices are published by BCIS. Due to the high specification expected in the development, qquality ratio will require an assumption based on published information on comparable developments. Secondly, the client may require a BREEAM Excellent Score. So the question is how much adjustment or uplift is required in building cost to achieve BREEAM excellent?

4.5 Determining the Cost of Planning Obligations

Difficulties can arise in estimating the values of planning obligations and/or certain variables so assumptions have to be made in certain circumstances. For planning obligations such as section 106 agreement, Southwark Council has clearly defined procedures including suggestions from the public on how to mitigate the impact of a new development in the surrounding area as part of the planning application process. Section 106 Agreement is designed to ensure that new developments enhance local communities and to reduce the impact of developments on local communities. As part of the Southwark approach, they have the Section 106 Supplementary Planning Document (SPD) to guide the negotiations for Section 106 planning contributions and to ensure greater transparency and openness. They have also set up a community infrastructure project list (CIPL) to identify priority local infrastructure projects to be for physical improvements supported either by Section 106 contributions or CIL funds. Example of contributions arising from planning obligations range from the provision affordable homes, open space including landscape and tree planting, facilities for sports development, transport enhancement, to funding of school places or employment and training schemes.

Southwark Council has developed a Section 106 Planning Obligations Workbook as a tool to calculate the planning contributions required for a proposed development project.

Extracts from site specific transport section of the Workbook is shown in the Table 8 below:

Table 8: Examples of planning contribution costs for site specific transport

Examples of Specific transport initiative	Unit of measurement	Number required	Cost per item (£)	Contribution required (£)
Pedestrian crossing 1. Pelican 2. Toucan 3. Zebra	Item		 40,000 50,000 30,000	
Traffic calming 1. Flat top hump 2. Round hump 3. 3 cushions	Item		 12,000 3,000 1,000	
Widening footway over road	Linear metre		60	
Widening highway over footway	Linear metre		90	
Install cycleway on road	Linear metre		25	
Securing land footway/cycleway				
Cycle stands	Item		300	
Travel plan monitoring			3,000	
Other initiatives				
Engineering fees (15%)				

The planning obligations, often the social and environmental costs, relating to particular development projects can be implemented in two ways – either the developer can implement it or pay the council for the works to be carried out. There is also a separate element for strategic transport initiatives applied to major residential, commercial and retail development and cross rail charge based on a strategic transport investment rate. The total contribution from a proposed development is based on the number of residents and/or employees.

Similarly, the planning obligation contribution costs are determined for other elements relating to open space, sports development, children's play equipment, archeology priority zone, affordable housing, employment and training and school places based on a number of factors and ratios such as contribution per occupant

4.6 Determining Rental Income

Several factors determine rental income such as rental growth, availability and take-up rates, vacancy rates, development projects in the pipeline (under construction and planned development), proximity to other areas. In difficult economic climate characterised by redundancies and business failures, there will be increasing vacancy rate and oversupply leading to falling rental values. It is prudent to use the average rental price for a property in in a similar location and then adjust for differences. The Shard is reported to have received rentals starting from £50 per square foot, with the highest rate nearer £70. In terms of the value of sustainability, a recent development (192,252 sq. ft. of office space) awarded

BREEAM Excellent rating receives an annual rent of £5.8 million per year which works out at £30 per sq./ft. (£323 per sq/m). Based on research of available information, a data and assumption sheet is created (Table 7) which will then feed into the financial model.

4.7 Determining the Value of Other Variables

Other variables, for example, finance rate depends on several factors such as capital put towards loan (deposit) - term of loan, whether long term or short term and ccompany credit history and a comparison with other projects of the similar size and duration.

Table 9: Example of Data and Assumptions Sheet

Variable Name	Quantity	Unit	Notes
Gross Internal Floor Area (GIFA)	27,600	m2	
Lettable Floor Area (LFA) 85% of GIFA	23,460	m2	
Construction Cost	2,800	£/m2	
Yield	5.5	%	
Contributions from Planning Obligations			SPD#
Annual Rent	350.00	£/m2 per month	
Finance (Interest Rate)	0.50%		
Land Purchase to Start of Construction	6	months	
Construction Duration	28	months	
Void	3	months	
Total Development Period	37	months	
Profit on development value	20%		
Professional Fees (Architects, QS and Engineers)	12.5%		
Contingency Sum	3%		
Letting Fees as a % of annual rental	15%		
Sale Fees as a % of capital value	1.5%		
Land Acquisition Fees as a % of land value	4%		

#To comply with Section 106 Supplementary Planning Document (SPD)

The residual appraisal method is traditionally used in two ways as discussed earlier. First, to assess the level of profitability (return generated) for a proposed project where land value is an input into the appraisal; and, secondly, to establish a residual land value where a predetermined level of return is expected by the developer. In practice, the technique can also be used to determine other variables in the development process other than the residual land value and profit such as the level of planning obligations that can be afforded (social cost), direct costs for property development, building cost (including environmental cost for BREEAM compliance) to generate a desired level of profitability. However, it should be noted that the value of development is not directly related to its cost.

The RICS Guidance Note recognizes that the residual approach can be applied with differing levels of information and sophistication and it is up to the appraisal team to decide on the most appropriate application of any financial model, bespoke or otherwise. An example of a financial model is shown in Table 10 but in practice different approaches are used.

Table 10: Detailed Calculations

Development Value			
Annual rental income	8,211,000		
Capitalise	18.1818		
Capital value			149,290,909
Less profit at 20% of capital value			29,858,182
			119,432,727
****Development Costs**			
Construction Costs			
Building	72,974,400		
Professional fees	10,946,160		
Contingencies & risks	2,189,232		
		86,109,792	
Finance			
Finance on half building costs for construction period	7,850,630		
Finance on building costs for void period	1,428,561		
		9,279,191	
Letting & Sale costs			
Letting fees 15% of annual rental	1,231,650		
Promotion, say	430,000		
Sale Fees 1.5% of capital value	2,239,364		
		3,901,014	
Total Costs			99,289,997
Land value including finance & fees			20,142,730
Less finance over development period			0.8014
			16,143,190
Less acquisition costs 4%			645,728
SITE VALUE			15,497,462
		say	**£15,500,000**

*** Section 106 and other planning obligation/contribution costs not included.*

Costs relating to Section 106 and other planning obligation liabilities are crucial and could have a significant impact on the site value to the landowner and return to the developer. These costs should therefore be carefully determined in accordance with Section 106 Supplementary Planning Document (SPD) of Southwark Council.

Table 11: Summary calculations

Development Value		
Capital value	134,442,000	
Less profit at 20% of capital value	26,888,400	
		107,553,600
Development Costs		

Construction Costs	79,894,911	
Finance	8,609,476	
Letting & Sale costs	3,555,777	
Total Costs		92,060,164
Land value including finance & fees		15,493,436
Less finance over development period		0.8014
		12,417,060
Less acquisition costs 4%		496,682
SITE VALUE		11,920,377
	say	**£12,000,000**

Table 11 provides a summary of the key variables to determine site value. Using data available and assumptions made, the estimated value of the site is approximately £12,000,000 as detailed in the Residual Land Valuation. The value of £12m is the maximum price which should be offered, and it is advisable to start off negotiations much lower to try and maximise potential profits taking into account the influence of planning obligation costs. From a purchase of £12 million for the site a profit of 20% can be realized from the development if the site value is reduced by an amount equal to the cost of planning obligations.

Purchasing the land over this price will reduce the profit margin which could be further reduced if planning obligation costs are factored in. It is therefore appropriate for sensitivity (scenario) analysis to be undertaken. First, this would help to examine the effect of changes in the value of key variables on the residual land or site value (or developer's return). Second, it would help to test the main assumptions to ensure that they are robust, before a final decision is made. Certain scenarios can be considered such as:

- If rental values drop by 20%
- If building costs increase by 20%
- If costs relating to section 106 and other planning obligations are included
- If the yield changes

It is useful to explore, for example, the sensitivity of changes in rental income and property yield combined on the value of the development value. See example (unrelated to this particular development) shown in Table 12.

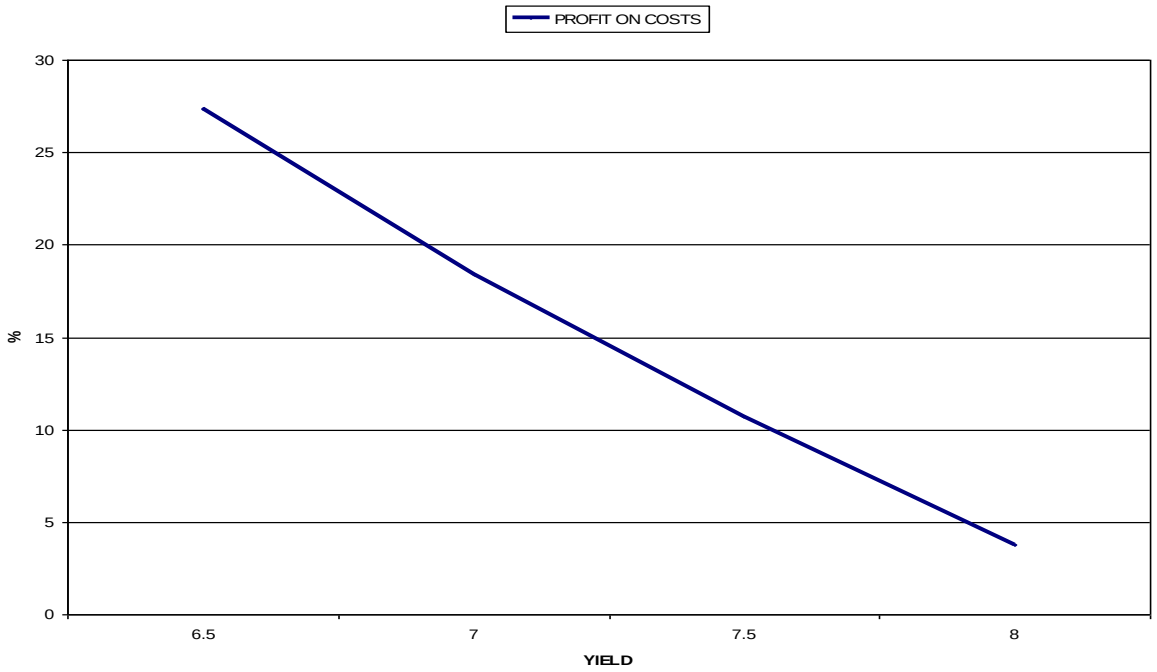
Table 12: Sensitivity of property yield and rent on capital value of a development scheme

	Yield (%)				
Rent (£/sqm)		**6.5**	**7.0**	**7.5**	**8.0**
	325		5,083,046		
	300	4,957,118	3,333,492	1,926,349	1,433,337

	275		1,583,938		
	250		-165,165		

Changes in the rent and the investment yield will therefore significantly affect the capital value of any development scheme. A key challenge for any developer is to arrive at a design solution that will maximise rental income for a given development cost. Another scenario can be explored such as the sensitivity of property yield on profitability (see example shown in Figure 5).

Figure 5: Sensitivity of Property yield with respect to profit



5. Concluding Remarks

Uncertainty and risks are usually taken into account by examining a range of outcomes such as pessimistic, most likely and optimistic to generate a range of values sometimes called the sensitive range. The objective of any developer is to maximise return or profitability determined by two major variables – development value and development costs. The risks associated with the key variables for any development should therefore be reduced in terms exploring the factors that affects development value (e.g. prices, rents, yields) and development costs (e.g. land, project (including build) cost, finance cost, void periods).

For example, to minimise risk, a house builder could sell units “off-plan” and a developer could arrange a “fixed price” construction contract and/or borrow at a fixed-rate. Reducing void and uncertainty in rental income could be achieved through for example pre-letting and good market research to attract appropriate tenants. To reduce the risks associated with building cost due to unusual design with innovative sustainability features, excellent design co-ordination, good communication, good cost control, good construction team and specialists on sustainability including an experienced architect can be appointed.

It is recommended by the RICS Guidance Note that the appraisal team should check residual development appraisals with market evidence. The checks should focus on the following:

- Comparison with the sale price of land for similar development
- Calculation of the ratio of the residual site value to the capital value of the scheme and
- Assessing how this ratio compares to other evidence of similar transactions.

References and Further Reading

BRE and Cyril Sweet (2005) *Costing Sustainibility: How much does it cost to achieve BREEAM and Ecohome ratings?* BRE Information Paper

Cadman D, and Topping R (2009): Property Development, E & FN Spon

CBRE (2009) Who pays for green? The economics of sustainable buildings, CB Richard Ellis and EMEA Research. Accessed from www.cbre.eu/environment on 20th Oct 2013

Department for Communities and Local Government (2013).*Community Infrastructure Levy, the* (Amendment) Regulations. 2013 (Statutory Instruments). 2013 No. 982. Community Infrastructure Levy**,** England and Wales

Halcrow, Davis Langdon and Cyril Sweet (2010), Capital cost of sustainable offices, Full Report of South West of England Regional Development Agency (SWRDA)

Gilchrist, A and Allouche, E.N (2005) Quantification of social costs associated with construction projects: state of the art review, Tunnelling and Underground Space Technology, 20, 89-104

RICS (2012) RICS Guidance Note: Financial Viability in Planning, 1st edition (GN 94/2012), Published by RICS, Coventry, UK, www.ricsbooks.com