

ENVIRONMENT DESIGN GUIDE

UNDERSTANDING QUANTIFICATION IS ONE KEY TO DELIVERING ENVIRONMENTALLY SUSTAINABLE ASSETS

Mark Quinn

SUMMARY OF

ACTIONS TOWARDS SUSTAINABLE OUTCOMES

Environmental Issues/Principal Impacts

- Seeking to prove financial (bankable) benefits of sustainable design rather than less objective benefits
- Taking a holistic approach to design evaluation
- Understanding the motivation of stakeholders
- Exploring all avenues for design evaluation

Basic Strategies

In many design situations, boundaries and constraints limit the application of cutting EDGe actions. In these circumstances, designers should at least consider the following:

- Taking a holistic approach to design evaluation
- Understanding the motivation of stakeholders
- Using cost and quantity as an evaluation input
- Seeking to prove shorter term benefits of sustainable design.

Cutting EDGe Strategies

- Better benchmarking opportunities
- Better evaluation opportunities
- Depreciation and capital allowance opportunities

Synergies and References

- AIQS ACMM Volume 4: *Evaluation of Sustainable Development*
 - *Australian Standard Method Of Measurement Of Building Works* – Fifth Edition
 - *BDP Environment Design Guide*: GEN 10, GEN 30, GEN 44, GEN 49
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UNDERSTANDING QUANTIFICATION IS ONE KEY TO DELIVERING ENVIRONMENTALLY SUSTAINABLE ASSETS

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The following note discusses how the Quantity Surveyor's skills can be harnessed in the development of environmentally sustainable design. It focuses on the skills of managing quantity and the relationship of quantity to cost and environmental performance.

Should the threat to our standard of living markedly increase due to a diminished environment, the conflict between economic and environmental responsibility will begin to align and the debate over the exploitation of resources will become a front running issue in future design. Until economies and markets reach this point, the argument for environmentally sustainable design will have to be proven by showing that there are economic benefits in using traditional indicators and objective benchmarks.

1.0 WHAT ENCOURAGES THE DECISION TO DEVELOP AN ENVIRONMENTALLY SUSTAINABLE BUILDING?

The current motivation to introduce environmentally sustainable initiatives into construction projects is prompted by numerous factors that are not only related to traditional development drivers, such as the need for new and better space and development returns, but is underpinned by an increasing environmental consciousness. This consciousness is developing with a growing public awareness of limited natural resources and a sense and acknowledgment of the pressure being placed on the environment.

Many occupants, owners, designers and regulators of the built environment believe that there is a benefit in environmentally sustainable development. Unfortunately the belief is unrealised in most traditional cases, not because these developments are not feasible, but because we really have not established a platform on which to objectively evaluate them.

Historically the needs of property development has been perceived to be sensitive to the environment in which it is located, to the extent that the built environment has been planned and created to minimise or mask development from the effects of pollution or poor/defaced environmental settings. For example many of our cities have been planned and zoned so that industrial activities are not located within residential zones, where waste produced is collected and removed, and where the energy used is delivered with little regard to environmental cost. This is simply because it has been possible to develop and sustain development activity in an economically responsible manner, without placing a value on environmental cost. Economies are based on this premise and until it is possible to

align what is *economically* responsible with what is *environmentally* responsible, there will be debate about the real environmental cost.

Despite the environmental debate three issues remain relatively certain.

- (1) Population is increasing
- (2) Pollution/environmental damage must be controlled
- (3) Our resources are limited.

These issues affect the development of property through increased demand and increased costs. The debate for the built environment and its design now lies in the evaluation of economic costs and the length of time it takes before it is aligned with environmental cost.

These issues, along with general public concern about the physical environment, need to be considered in the future design of property. As concern increases it should place pressure on demand trends, government regulation and the economic value in assets. Examples of where these pressures have affected design parameters are:

- Regulation - for example, the Building Code of Australia (BCA) is exploring the introduction of a star rating for both residential and commercial developments and will continue to regulate with an emphasis on sustainability
- Planning - measures being introduced into planning schemes demand a focus on environmentally sustainable development (e.g. Melbourne Docklands and other municipalities where various rating schemes and initiatives are noted as planning requirements)
- Corporate plans - For example, the Green Building Council of Australia is headed by major property groups
- Market forces - a belief in the market that ESD is desirable, e.g. it is becoming standard in the development of work practices, material development, etc.
- Economic forces - Development costs are rising and are linked to the delivery of buildings, whether it is material, process or product. For example, old growth timber as a scarce resource is now being regulated in its harvest and production and alternatives are constantly being introduced into construction.

Despite all this we still have difficulty in aligning economic and environmental issues.

As property markets have become more sophisticated they are able to demand a much quicker response to the economic outcomes of property. It is only relatively recently that property investments have been packaged and sold as units, like equities, to the extent that the traditional long-term behaviour of property has been, in part, removed from the retail market. A unit of property investment can be bought and sold with little regard to its physical performance. Property risk profiles can be blended to create attractive asset-backed stock. This induced, short term view on property places less importance on the long-term performance of property, and reduces the perceived effectiveness of many environmental initiatives.

Additionally the focus on 'value' in property is generally on the generation of income and the preservation of medium-term cash flows (income). Often little regard is placed on long-term capital expenditure or operating costs as traditional returns and investment horizons do not fully consider these costs. Investment horizons in terms of property are generally far less than the combined useful life of an asset and net incomes generally do not consider the performance of a property. Net incomes are far easier to manage in terms of investment risk, as they eliminate the occupier as a variable.

Although indicators for property development and investment have become more sophisticated, and provide a greater ability to analyse decisions and review success and opportunity, environmental sustainability is still difficult to evaluate. Base economic drivers of property development have not changed. Real estate is still primarily concerned with the provision of marketable space. Property is capital intensive, still tends to follow development cycles and is costly, time consuming and risky to exchange. As such, property assets still behave like property assets.

2.0 SO WHY IS IT SO DIFFICULT TO OBJECTIVELY EVALUATE ENVIRONMENTALLY SUSTAINABLE DEVELOPMENT?

Most designers would consider that in the evaluation of environmentally sustainable design the focus is on the ability of a building to align with its environment and its occupiers. Designers are interested in a development's ability to use fewer resources over time, whilst providing a healthy and comfortable environment, focusing on the combined useful life of the asset. In comparison the retail focus on property looks for shorter-term results or a secured cashflow. The sustainable focus here is on the 'sustainability in design' that provides savings on capital cost and 'marketability of product' rather than a reduced cost of occupancy or overall environmentally sustainable result.

Current thinking seems to be that energy consumption is the key driver of environmentally sustainable development and design should be seeking to maximise environmental sustainability through the reduction in overall energy consumption. Although this may be the case, competition and the sale of space motivate most developments. Often the stakeholders in development are not initially motivated by reduced energy consumption that provides payback on capital in the future: they are seeking far shorter-term results. Therefore it is most important for the acceptance of environmentally sustainable design, that the longer-term returns be reflected in the short-term evaluation result. This can possibly be achieved through regulation or by providing a better short-term outcome in the evaluation of good design. Either way a change in the way the market sources property will require a shift in focus to appreciate the real benefits of environmentally responsible development. The opportunity to implement this change can originate from the design team.

3.0 TO PROMOTE THE BENEFITS OF GOOD DESIGN A SOUND UNDERSTANDING OF THE STAKEHOLDERS' OBJECTIVES IS IMPERATIVE.

In the development process, design objectives are often confused, due to a poor understanding of the design brief or poor understanding of the client's objectives. The designer's client will no doubt be a stakeholder of some sort in the development process. As a stakeholder, the client will have a relationship with the environmental outcome that will be linked to the investment profile of the property. Focusing on that profile will assist in evaluating and promoting the design.

Each stakeholder in the design process is likely to have differing objectives, with all seeking to maximise their position. An understanding of these competing objectives puts the design professional in a strong position to promote consensus and appropriate design for each development.

This is not to say that a development scenario will not achieve a more environmentally responsible outcome if designing for a less motivated stakeholder. It just means that the direction to their end needs to evolve by promoting opportunities that maximise their position in the process. For example a developer looking at introducing a tenant to a property will need to understand how the environmental attributes of a development will give the tenant an advantage in conducting their business. This may be through lower occupancy costs relating to rent or outgoings or it may be through improved efficiency in conducting business.

Stakeholder reference	Owner occupier scenario/governments	Development driven scenario
<i>Property user</i>		
End user/tenant	Directly linked	Often distant, possibly engaged if introduced by the developer
Visitors	Linked to the tenant/limited by the building's use and management	Linked to the tenant/limited by property management
<i>Property ownership</i>		
Short term owner	Likely to have a medium-term objective in order to maintain value	Likely to be seeking a commercially acceptable objective driven more often by short term returns
Long term owner (investor/trust)	Likely to have a long term objective to suit lease structures	Likely to be seeking a commercially acceptable objective driven more often by shorter term leases
<i>Building procurement</i>		
Developer	Initial capital is considered in conjunction with future use and cost in use. Managing cost is more likely to be concerned with business operation	Initial capital is considered with a short-term view on risk to liability and divestment. Understanding cost is more likely to be concerned with reducing cost
Design team	Tendered based on quality	Tendered based on relationship and ability to deliver
Builder	Tendered based on quality and cost	Tendered based on relationship and ability to deliver
Valuer	Concerned with quality and tenure	Concerned with quality and tenure
<i>Design and regulation</i>		
Designer	Needs to satisfy the needs of the user	Needs to satisfy the commercial objective.
Enforcer/Regulator	Seeks to protect the future use and occupier. Relationship is via a design team	Seeks to protect the future use and public. Relationship is via the design team
<i>Property management</i>		
Property manager	Often employed directly by the occupier	Often employed without consultation of the occupant
Property owner	Often is linked to the business. Decisions relating to productivity are more easily achieved	Often removed from the operations in a practical sense. Is driven by cost

Table 1. Objectives of stakeholder positions in two different scenarios

Table 1 shows how the objectives of stakeholder positions alter in two different scenarios.

The role of the design professional is to design to a given brief. Having an understanding of what motivates the brief and how to answer it in terms of environmental sustainability may assist in an improved product. Promoting environmental initiatives for most designers is difficult in terms of reference; they often need objective, acceptable benchmarks to articulate their design.

4.0 WHERE IS THE QUANTITY SURVEYOR IN THIS PROCESS?

The quantity surveyor is often described as the independent consultant who is responsible for the capital cost of building projects. This definition describes two important functions of the quantity surveyor's role: independence and money. The quantity surveyor's client in most cases will be the

one who ultimately makes decisions with respect to material selection, obsolescence, life cycle, etc. albeit in many cases for debateable reasons and driven by their stakeholder position. Nonetheless the quantity surveyor, like many other design or consultant professionals, is placed between many conflicts in the development process. Their position as part of the design team is often overlooked as being 'in conflict', rather than being introduced to evaluate and add value to the design. Similarly the design team can assist the quantity surveyor to develop relevant analysis to ensure that good design decisions are made.

The quantity surveyor's role is aimed at providing cost management for the whole of building life, one of the fundamental tools of which is the measurement of scope, function and quantity. The skills that have evolved in compiling quantities are quite particular and can provide a different focus on the design and the development equation. The quantity surveyor has the ability to use and analyse these quantities in providing advice for objective decisions made during the design process.

Initially the quantity surveyor's role was to provide a quantified list of materials to prospective developers/builders. These schedules of quantities were used to order materials or to enable a fair and considered tender process. From the evolution of this process many skills and services have emerged that are structured to aid in the design, development, construction and investment process. A good quantity surveyor is able not only to provide a reasonable level of quantification but also to provide it in various forms of objective analysis for decision making. Quantities if delivered in an appropriate way for review can be analysed to provide many outcomes. For example many software packages used by the quantity surveyor should be able to provide an analysis of plant materials and labour required for construction, a review of which materials are affecting cost, or even a projection of embodied energy. The same analysis can also be used to refer to the life cycle costs and likely churn rates that would be related to particular material choices, relative to the investment horizon of the development brief or to the depreciation benefits available.

During the design and delivery phases the quantity surveyor can assist in the following ways:

Feasibilities – providing the basis for evaluating variables that affect the bottom line in a proposed development. These variables may include capital cost, embodied energy, rental structure options, payback periods, life cycle-costing, cost in use, depreciation, etc.

Cost planning – Cost plans are primarily concerned with the capital costs of a building. They occur at various stages during design development and can provide the basis for evaluation of environmental design considerations, such as passive solar design and the interaction of design costs between elements. Trends in performance of buildings can be related to the cost plan if the initiatives are articulated and incorporated in the elements of the cost plan. Opportunities and suggestions can be made based on expected elemental and quantity relationships.

Life cycle costing – To date the study and analysis of the useful life of materials related to their cost has been used in various forms to evaluate the environmental performance of a development. The quantity surveyor is able to provide a sound basis for such analysis by establishing a well-structured cost plan. Only when the cost plan has been established can objective analysis be conducted with reference to useful life cycles and cost in use. This is also where a holistic approach needs to be undertaken, where all elements of a development can be reviewed, to better understand the relationships between passive design initiatives and the more identifiable energy/services options.

Financial modelling – In comparison to analysing a project as one whole, seeking cost and quantity related centres for project evaluation can provide powerful analysis. The development cost models derived from the cost plan can assist in design planning that aligns with the project's brief.

Documentation phases – checking documentation during measurement evaluation or the design documentation period from an overall perspective for omissions, constructability or conflicts.

Tendering – Assisting in seeking and analysing/evaluating tenders.

Option evaluation – Assistance in evaluation or defining specific design options.

Asset registers – Although asset recognition for accounting purposes is not a realistic tool for the evaluation of environmentally sustainable development, asset registers for property developments that have been developed as part of the design process, will have a post-occupation use beyond accounting. Occupancy costs and post occupancy evaluation can be related cost centres that have evolved from the design, to provide a link back to the asset register.

Capital allowances and depreciation – Opportunities for government bodies to promote environmentally responsible development have not yet been provided through depreciation incentives. The quantity surveyor has in recent decades played the intermediary role between the development of an asset and the accounting of that asset through depreciation schedules and asset registers. Recent tax reform has restructured the capital allowance and depreciation laws to provide far less write-off value for property than over the past few decades. Depreciation legislation was traditionally developed in the late 1930s for all asset classes and could be used by government to promote better returns for environmentally responsible developments. There are opportunities to promote environmentally sensitive design through taxation incentives. For example, acknowledging passive design initiatives via increased (Division 43) capital allowance write-offs.

Due diligence – Technical due diligence is primarily concerned with the condition of an asset at a particular point in its life and becomes relevant at the point of sale of a building. As discussed previously, the attributes of good design, construction and performance can be related and measured with respect to quantity or costs. Quantity, condition and performance can be blended to provide objective benchmarks at a point in time. Objective references to sustainability in vendor and purchaser technical due diligence reporting will become more warranted as better benchmarking for environmentally responsible design is developed. Quantity based applications such as replacement cost plans can be used to forecast life cycle profiles, occupancy costs and to demonstrate environmental design attributes as part of a due diligence investigation. The opportunity to constructively provide relevant advice in the design process is linked to the process itself. As a consultant it is important to understand the brief and the desired outcome of the client, but it is equally important to understand the role of all design consultants. Quantity surveyors are not designers, nor are they engineers. Only in collaboration can the design team effectively provide advice in the process of environmentally responsible design.

The quantity surveyor's ultimate role in a design process should aim to provide the following:

- An understanding of the relationships of environmental elements in the design expressed through the cost plan.
- Contribution to an objective environmental measurement/costing mechanism throughout design and implementation.
- Contribution to a better understanding of the value environmental design can add to the developed property in the short and long term.
- Promotion of realistic life cycle modelling.
- Promotion of better interaction between design professionals.

Australian Institute of Quantity Surveyors (AIQS) publications

Industry standards do not always enforce good design, but they do provide a vehicle for assessments to be made with some comparative certainty. They assist in providing a benchmark for evaluation and specification as well as industry recognition. The AIQS has developed a set of guidelines for quantity surveyors, known as *The Australian Cost Management Manuals*:

Volume 1 – Construction cost planning

Volume 2 – Elemental and sub-elemental definitions and coding

Volume 3 – Life cycle costing

Volume 4 – Evaluation of sustainable development.

In addition to the *Cost Management Manuals* the rules for quantifying construction are provided in the *Australian Standard Method of Measurement of Building Works* (AIQS).

CONCLUSION

There is an opportunity for the quantity surveyor to play a far more proactive role in the development of environmentally responsible design and to promote a significantly better appreciation of the attributes of such design. There is also an opportunity to develop improved benchmarks for environmentally responsible developments so as to convincingly demonstrate how environmental design can be aligned with a project's objectives. A better projection and understanding of the passive and unseen environmental design and cost elements will provide a greater stakeholder acceptance of environmentally responsible development.

Until our standard of living is undeniably threatened by environmental degradation, the key to environmentally responsible design is portraying it not only as a product that provides desirable and responsible space, but also as a financially desirable asset.

BIOGRAPHY

Mark Quinn is a qualified quantity surveyor who has been associated with Rider Hunt for over 20 years. During this time he has been involved in numerous projects providing an array of services from cost management to life cycle costing. He is the Vice-president of the AIQS Victorian Chapter Council and a lecturer in Conceptual Estimating at RMIT.

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