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Review of the BRANZ Green Home Scheme

Roman Jaques

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Preface

This research updates and improves the 1997 version of the BRANZ *Green Home Scheme* (GHS), a method of eco-assessing New Zealand domestic building designs. This review examines technical and managerial aspects of the GHS from user feedback and accreditation workshop attendees, recent national legislation and guidelines, and overseas developments in environmental building assessment tools. Details are given of what should be incorporated into the revised (2004) edition of the GHS technical manual to ensure it is more reflective of 'best practice' eco-building tools operating internationally, and initiatives to fine tune managerial issues to improve its uptake and enhance its operation.

Acknowledgements

This research relied heavily on the goodwill of BRANZ *Green Home Scheme* workshop attendees – architects, designers, and building technologists – who donated their time in the completion of the questionnaire. A special thank you to all.

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Readership

This report is intended for environmental engineers, social scientists, designers and researchers.

REVIEW OF THE BRANZ GREEN HOME SCHEME

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Roman Jaques

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KEYWORDS

Environmental auditing, environmental building assessment, Green Home Scheme, eco-auditing, green building assessment, and environmental building performance.

ABSTRACT

This study report examines the BRANZ *Green Home Scheme* (GHS) – a domestic-building environmental auditing tool which has been operating in New Zealand since late 1997. The intent of the review is to ensure that the revised version is as current, effective and user-friendly as possible, since there have been significant changes in legislative requirements and much progress in environmental science and auditing methodology.

The GHS was examined mainly through a survey of users and workshop attendees. However, an overview of the scheme's source document (called BREEAM – which was developed in the UK), as well as other key international eco-auditing initiatives was also examined, to ensure that the scheme is current and of a globally high standard.

It was found that only a few changes were necessary to the scheme. In terms of the GHS's technical aspects, the existing set-up is seen to be working well overall, with only a few minor issues needing attention. These changes will be incorporated into the revised 2003 version of the GHS. In terms of operational issues, the most important aspect that needs addressing is the scheme's publicity and promotion.

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1. UPDATING THE GHS '97 AUDITING TOOL

1.2 Introduction

BRANZ has, since late 1997, provided a domestic building eco-auditing tool for New Zealand use. The original goal of the tool – named the BRANZ *Green Home Scheme* (GHS) – was to provide designers, developers and the public with an independent, whole-building environmental assessment system specifically tailored for New Zealand conditions. The GHS was to be easily applied, yet give a good indication of how environmentally 'accomplished' a particular domestic design was (Jaques, 2000). The BRANZ *Green Home Scheme* consists of two main documents – the GHS *Designers Guide* (a technical explanatory document of the working of the scheme) and the associated GHS *Assessment Worksheets* (the detailed auditing sheets for the assessor).

Advances in environmental understanding and its application suggest that there is now a need for a revision of BRANZ Green Home Scheme. Since its launch, the range and sophistication of international eco-auditing tools for buildings has expanded considerably. Most recently, there has been growing interest in the development of more inclusive and flexible "second generation" auditing systems which are very comprehensive in nature while accounting for regional differences. Also, there have been great changes in central government policy on environmental matters, with the introduction of a suite of strategies (such as Energy, Transport and Waste – referred to as the 'Foundation Policies') which have implications for this auditing system. Government funded research was funded with the expectation that the identified climate change issues would be included in an updated version of the BRANZ Green Home Scheme. In addition, there has been substantial interest in the area of sustainable urbanism, with guidelines being produced by many of the larger city councils.

As part of the GHS review, there were three core issues which needed to be examined in some depth:

- How can the scheme's effectiveness (i.e. the issues addressed, the weightings given, its ease of application and its management) be improved?
- Is there a focus on the more important issues, as perceived by those using the tool? Are these issues and concepts reflective of the latest international tools?
- Why have there only been a few dozen GHS certificates awarded over the last five years?

This report is divided into three areas:

1. The BRANZ *Green Home Scheme* survey.
2. Recent national and international developments in domestic eco-auditing tools.
3. Conclusions and recommendations.

It should be noted that one of the primary goals of the revision was to ensure that the level of difficulty in obtaining the various Environmental Performance ratings set within the GHS – fair, good, very good and excellent – is not significantly changed. This is necessary, so as not to devalue previously awarded certificates.

2. THE GHS SURVEY

2.1 Background

A survey of GHS workshop attendees, who had attended workshops held over the past five years, was conducted in early 2003. The development of the survey was mainly assisted by CRESA (Saville-Smith, 2002) with reference to an instructive manual produced by Christchurch City Council (Jamieson, 1999). The two key objectives of the survey were:

- to provide feedback on how the scheme is currently operating and therefore improve its operation
- to investigate eco-design experiences and the information needs of practitioners.

As a result, the questionnaire was divided into two parts:

PART ONE: Specific questions on the GHS operation and application, specifically:

- How the GHS is being used.
- Whether the current GHS issues/rating/methodology/publicity/back-up and support work well.
- Suggestions for future improvements.

PART TWO: Generic questions on green design (examining which eco-issues are seen to be the most important and the preferred sources of information used), specifically:

- What barriers exist to the application of eco-design?
- Preferred tools for eco-design?
- What are the most important eco-related issues facing homeowners.

2.2 Methodology

The survey started with an introductory phone briefing, which was then followed by a formal eight-page questionnaire. Covering letters, survey questionnaires and postage-paid envelopes were then sent out to more than 40 BRANZ *Green Home Scheme* workshop participants. Workshop participants can be grouped into *technologists* (building consent officers, environmental educators, resource engineers), and *designers* (architects, designers and architectural draughtsmen). In all, 22 questions were asked (15 specific, 7 generic), with an overall completion time estimated to be around 10-15 minutes. A full questionnaire form and its accompanying cover letter can be found in the Appendices.

The reply rate (i.e. the number of actual posted replies as a proportion of those who were sent the questionnaire) was 68%. The high response rate may be attributed to a number of factors, including:

- A verbal commitment given over the phone from a large number of respondents, given as part of the introductory phone call.
- The predominantly short answer nature of the survey combined with the short completion time required (estimated to be between 10-15 minutes).
- The included pre-addressed business reply-paid envelope, streamlining the reply process.

It should be noted that the survey respondents are probably far from representative of the average New Zealander – or even the average New Zealand technologist/designer. The respondents are more likely to be:

- male (at around 85%)
- 'early adaptors', by their very nature
- highly self-motivated in terms of eco-building
- better educated on environmental issues in general.

2.3 Results and discussion

Each survey question is coded in its abbreviated form (**Q3** for Question 3, etc), with its associated discussion immediately following. Those who completed and returned the questionnaire will just be referred to as "the respondents", for simplicity – whether they are designers or building technologists. Due to the small numbers involved, no occupation-specific analysis was carried out. For the longer answers, trends are only considered 'seriously important' when they are repeated by three or more respondents.

2.3.1 Part One: Operational issues

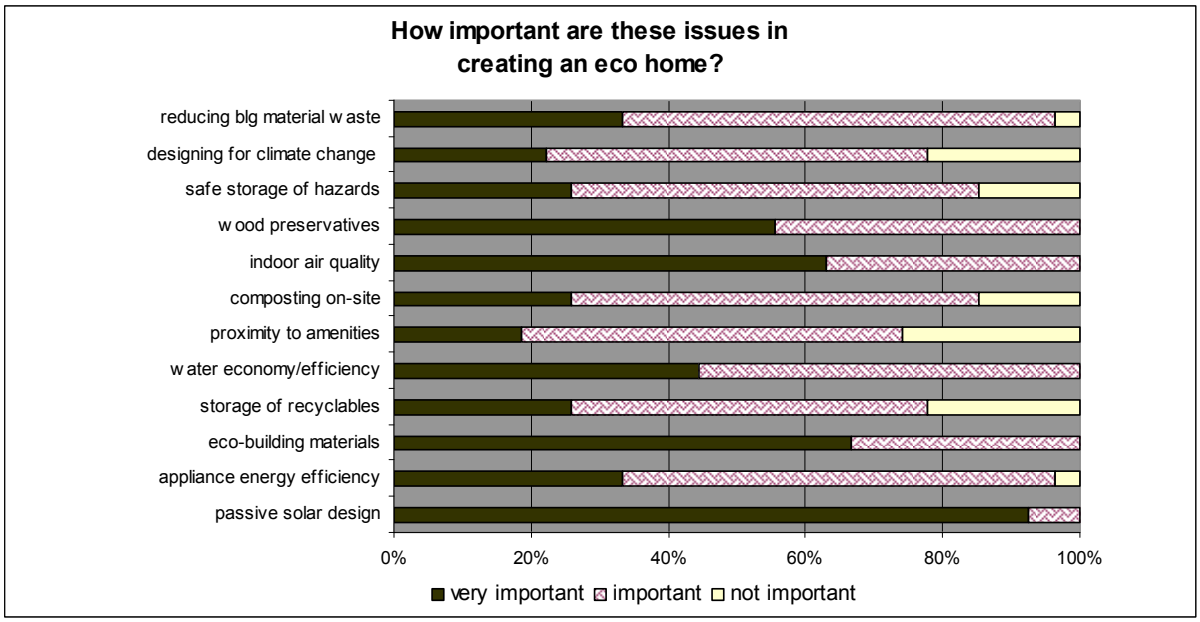
The following questions examine GHS-specific questions only.

Questions 3 and 4: 'Use and application of the GHS'
In response to how the GHS was applied (**Q3**), the majority of the respondents used it either as an 'informative document to introduce environmental principles into the design process', or 'as a reference to improve the environmental performance of home design'. Of the minority of respondents who used the GHS for "other" applications, the most common themes were 'as a marketing/promotional tool' or as an 'educational tool'.

Discussion
It seems that the GHS is not being used for its original intent – i.e. as a formal auditing tool/award scheme, being more commonly used for information provision on eco-design issues or, to a lesser extent, for marketing and promotional purposes (**Q3** and **Q4**). This is supported by anecdotal evidence from personal communications between the author and some of the respondents before and during the pre-survey phone calls. Some comfort can be derived from the assumption that even when applied informally, the GHS results in a measurable improvement in the design's environmental performance – which is at the core of its intended purpose. However, from a marketing and development standpoint, with only limited formal assessment and certification, promotional opportunities (and therefore market acceptance) is hampered. This issue is a key concern and needs to be rectified as part of the 2003 revamp. It will be further examined in subsequent discussion.

Question 6: 'Significance of various environmental issues'
Twelve building-related environmental issues were presented, with respondents asked to rank their relative importance into three categories: 'very important', 'important', and 'not important'. There was almost unanimous agreement that passive solar design techniques were 'very important' (refer Table 1). No other issue was seen as that (or even nearly that) important. There were four other issues, however, respondents saw as being at least 'important'. They were: 'eco-building materials', 'water economy and efficiency', 'indoor air quality' and 'toxicity of wood preservatives'. A large number of respondents found that the 'proximity to public transport' issue was 'not important' – more than any other single issue. However, the majority of respondents still thought the 'proximity' issue to be at least 'important'. Naturally, this issue is not one the designer has influence over, being a local planning one – and hence may go towards explaining the lower rating.

Table 1: Comparing eco-design-related issues



Discussion

Of the 12 'characteristics' of good eco-design provided, the first 10 issues are those which are already incorporated into the current GHS. [They are also the issues which are allocated the highest number of credits within the present scheme]. The last two issues assessed (climate change and construction material waste) were introduced as they are rapidly growing in importance, following international trends (Ministry for the Environment, 2002).

The responses to those first 10 issues suggest that they are valued as being important by the respondents also, implying that the bulk of GHS issues are aligned with those of the eco-design fraternity. This thesis is supported in **Q10** which examines the perceived accuracy of the GHS assessment procedure. That the 'proximity of amenities' issue was seen by a considerable number of respondents as being 'not important', is surprising at first inspection. International environmental experts are generally agreed that siting a dwelling close to a transport hub and/or to amenities is central to good environmental design (EECA, 2003). However, this has to be countered by the respondents' view that in most cases the siting of the proposed house is already a given, and therefore they are unable to influence its selection.

It seems that the response to the last two issues indicates that if included within the next edition of the scheme, they would receive majority support. Just how they could be practically addressed within the current GHS assessment framework (i.e. within a paper-based checklist procedure) will be explored further in section 3.2.1.

Questions 7, 8 and 9: 'Ease of use'

For those respondents who have used and applied the GHS, by far the majority thought that it was '*easy to apply to actual house drawings/plans*' overall (**Q7**). However, many respondents encountered difficulty in computing the insulation level (i.e. applying the heat loss calculation) to the house plans (**Q8**). The (unanimous) reason for this was that it is "*too laborious to work out the elemental (i.e. roof, ceiling, windows and wall) areas*", followed, to a lesser extent, by the "*difficulty in sourcing the correct R values (i.e. insulation values) for each material*" (**Q9**).

Discussion

It was encouraging that almost all of the users of the scheme found it easy to apply. However, the responses to **Q8** and **Q9** were disappointing for a number of reasons, namely:

1. The heat loss calculation method was chosen very carefully for the GHS thermal assessment, as it was seen to be a good compromise, being simple, fast and yet flexible enough to cope with a variety of non-standard designs. As alluded to in the appendix of the GHS *Designers Guide*, in assessment of a domestic building's thermal envelope, there are trade-offs in the degree of precision and time required – which is already heavily weighted on the side of speed/simplicity rather than accuracy. In fact, as an equation, the heat loss calculation couldn't be much simpler – it only consists of simple addition and division.

2. The existing calculation tool (i.e. the heat loss equation) is one that eco-designers would be more likely to be familiar with, as it is one of the three options of the Energy Efficiency Clause H1 requires to achieve compliance with the NZBC (1991).

3. The amount of credits allocated to insulation-related thermal performance – 6 credits – means it is highly weighted for the GHS. This implies that some degree of work is required to achieve them – yet only 35% of all the GHS assessments performed achieved credits for this. This conflicts with and undermines the commitment respondents say they have to passive solar design, for which significantly higher than NZBC levels of insulation are needed for its success (**Q6**).

The unanimous agreement that it is "too laborious" to work out the elemental areas was very disconcerting (**Q9**). This is a very simple procedure of measuring up the area of the roof, walls, windows and floor areas off plans. It suggests that either formal calculations are too off-putting and/or users prefer other, non-calculation based methods for determining solar design decisions. What these other (quantitative or qualitative) methods are is uncertain. However, some clues as to an answer are given by way of response to **Q21** and **Q22**.

For the good portion of respondents who found it difficult to source material R values (and therefore derive building element R values), this was also disappointing, as BRANZ has a manual specifically for this (BRANZ, 1995). The manual lists generic insulation values of common materials and is part of the instruction process within the BRANZ GHS accreditation workshops. There are also alternative sources for finding material and elemental R values, including BRANZ Appraisal certificates, product literature, a specific standard (NZS 4214, SNZ 2002) and the Consumers Institute of New Zealand. This issue needs to be addressed in future workshops.

Questions 10 and 11: Accuracy of assessment
By far the majority thought that the GHS assessment gives an accurate picture of a 'green' home, which is encouraging (**Q10**). For those who thought that the assessment procedure didn't give an accurate picture, no major themes came through (**Q11**), with responses ranging from 'doesn't check final as-built building' through to 'not enough attention on health issues'.

Discussion
This reinforces the idea that the majority of the respondents are happy with the technical aspects of the GHS assessment procedure and that, for a historically contentious area and new science, the GHS is generally hitting the mark.

Question 12: 'What doesn't work well'
In terms of what respondents thought didn't work well in the GHS, a very dominant theme came across – 'lack of publicity/advertising/promotion', with a secondary theme of 'a lack of buy-in from industry' in general. The secondary theme was seen to be considerably less important, garnering only half the amount of support.

Discussion
The theme of lack of promotion and presence in the market-place is a recurring one (see answers to **Q13** and the response to the 'general comment'. This needs critical attention if the scheme is to be successful.

Question 13: 'Scheme's visibility'
The issue that held one of the biggest surprises was the lack of sighting of GHS advertisements. A choice of seven publications where the GHS had been advertised was given. The majority of respondents had seen it in the bi-monthly *BUILD* magazine, with the *EcoLiving* magazine and the *Easy Guide to Eco-Building* (BRANZ et al, 2003) also gaining an appreciable number of responses. Surprisingly, though, almost a fifth of the respondents had not seen it advertised anywhere.

Discussion
The GHS has been advertised frequently in the first four publications listed in the survey (*EcoLiving* magazine, *BUILD*, the popular *Easy Guide to Eco-Building* (BRANZ et al, 2000), and in EECA's *Passive Solar Design for New Zealand Homes* (2000)) and occasionally at the last three publications provided. The GHS even has a regular slot in the *EcoLiving* magazine, which is a bi-monthly publication with a distribution of around 4500 copies (Flint, 2003).

It is unknown why the media presence is so low. This issue needs to be addressed seriously if the scheme is to be adopted more widely.

Questions 14 and 15: 'BRANZ support'
The majority of respondents have seemed to find it 'easy' or 'very easy' to access BRANZ support on the GHS (**Q14**). For those that did use the support, by far the majority found it to be either 'useful' or 'very useful' (**Q15**). A fair proportion, however, have never tried to access support.

2.3.2 Part Two: On Environmental Design in New Zealand

The following questions examined the broader issue of environmental design in New Zealand.

Question 16: 'Homeowner's views on green issues'
This question explored the clients' views when building a new home. There was a very even split between the first three answers, which were:

- "*Have not considered the environmental implications of their house at all"*
- *"Are interested in green issues, but not interested in a Green Home Scheme certificate"*
- *"Are receptive to green issues once they have been explained in terms of 'resource use".*

Very few respondents felt that these new homeowners had a bad perception of green/eco-friendly design.

Discussion
This result suggests that clients have a variety of environmentally-related views on building a new house, but generally fall into the category '*not well informed on building-related eco-issues prior to the design process*.'

Question 17: 'Barriers to eco-adoption'
The perceived extra cost of incorporating eco-design attributes was seen by respondents as the most common barrier a new homeowner has to including eco-design principles within the design process. It can be safely assumed that the cost considered here is the upfront, or initial

cost only, rather than the ongoing cost.[1] This first-cost barrier reflects international trends also (Goldstein and Rosenblum, 2003). A large number of respondents also thought that '*lack of publicity about, and awareness of, eco-design/living*', a '*lack of interest by the new homeowner in environmental issues in general*' and '*lack of support/direction from central government*' were very important barriers to people including eco-features within their new home.

Discussion

The results of this question are reflective of other research carried out in similar areas, most notably CRESA's New Zealand study (Saville-Smith, 1998), and the Australian study commissioned by the Sustainability Advisory Council (Institute for Sustainable Futures, 2003).

Saville-Smith's study examined barriers to the construction industry responding to climate change (which can be seen as a proxy for environmental issues in general). It showed that two important barriers were 'perceived and actual affordability constraints' and 'limited information about, and availability of, 'green housing technologies' by the consumer. This issue is further discussed in Section 3.2.3.

The Australian study examined the barriers to sustainable housing construction. The constraints identified were the:

- lack of financial and pricing signals for development investors to look beyond least-cost options
- lack of understanding of what is meant by sustainable development and industry best practice in the context of sustainable residential development. This lack of understanding exists within both the development industry and consumers who drive demand for sustainable buildings
- perception that regulation is both inconsistent and a time and a cost burden for the development sector while acknowledging that a 'clear and effective regulation for developers to strive to achieve better performance' is needed.

Questions 18 and 19: Sources of eco-design information

Respondents' sources for eco-design information were diverse (**Q18**). However, the top four most popular were 'periodicals', 'specialists within industry', 'books' and 'the internet'. For 'other' sources of information, conferences and study tours were mentioned. Information was primarily used for general design guidance (by far the most popular choice), with a considerable amount of respondents also using it as a prompt for including green issues (**Q19**).

Discussion

It was encouraging to see that, in such a rapidly advancing science, practitioners were investing time to remain current. What was surprising, however, was that the internet, with largely free, highly accessible and up-to-the-minute information was not used by more respondents – rating only fourth on the list.[2] This is especially surprising if the information is being used chiefly as general design guidance and as a prompt for green issues. It is unknown why this is the case, but perhaps there is the perception that the internet does not provide enough New Zealand-specific content. This issue could be explored further in future surveys.

[1] The short-sightedness of this decision can be easily seen in this example: a recent BRANZ study (*BUILD* April/May 2003: 14-15) showed that there are significant cost savings when installing insulation compared to those suggested by Publicly Available Specification (NZS PAS 4244, 2003), for well heated houses in Auckland and Wellington, when assessed over a period of 20 years. Naturally, this initiative doesn't even account for the 'other' less direct benefits such as health, comfort and durability.

[2] Hopefully this situation has been rectified somewhat with the inclusion of several key examples of good web references within the feedback letter (see Appendix C).

Question 20: 'Useful publications'
The most common eco-specific design-support type publication of those listed in **Q20** was the *Sustainable Home Guideline* (Waitakere City Council, 1998). This was followed by the Building Biology and Ecology (BBE) literature, *The Good Wood Guide* (Friends of the Earth, 1990) and the *Design for the Sun* (EECA, 1994) manual.

Discussion
The only New Zealand-specific green design assistance tool that can also be downloaded (section-by-section) off the internet for free was also the publication of choice by green designers (i.e. Waitakere's *Sustainable Home Guideline* (1998). This practical document, covers a good range of green design issues, all explained in lay-person terms. It is encouraging to see this document obviously filling a real information gap and being so widely used by the design fraternity. Waitakere City Council has been considering an update of this publication (Bielby, 2003), and this result provides support for such an initiative.

Questions 21 and 22: 'Wanted tools and guidelines'
A wide range of ideas were suggested in response to what New Zealand-specific information is currently lacking. Many of the ideas centred on more practical (but technically-oriented) information sources that designers can use (**Q21**). The answers to Question 22 reinforced this, with by far the majority citing "*a sustainable building sourcebook for use as a reference for practitioners"* as being the most useful eco-design tool, followed by "*an educational tool for the public which has details of sustainable building practices*", "*supportive standards/codes/guidelines*" and "*easy to use passive solar design tools*". There were no common themes for the "other" category.

Discussion
It seems that there is a need for a practical sourcebook (as already mentioned in **Q21**), as well as educational-based information for the public. How these informative documents should differ from those already existing (such as the *Sustainable Home Guidelines,* 1998) is unknown, however. In terms of new supporting codes and standards available, there are increasing numbers in this area (refer Section 3.2) as well as:

the earth building codes (NZS 4297, NZS 4298, and NZS 4299 (all 1998)

grey and black water guidance (AS/NZS 1546.2 (2001) and AS/NZS 1547 (2000)).

Unfortunately, the survey question did not enquire as to the *nature* of those supportive standards/codes/guidelines. This could be explored in a follow-up survey.

'General comments' Question
On the final page, space was provided for those wanting to provide general comments on any issue associated with green design – whether extending a prior issue or introducing a new issue. Although only half of the respondents answered this question, two themes were very dominant:

1. the lack of central government support for sustainability in general
2. the lack of a public profile of the GHS.

These ideas have been discussed previously.

A sample of the comments are as follows:

"There is no direction or support from central government to reduce energy consumption. Should be mandatory to install solar water heating in new houses and to retrofit insulation in cooler regions".

"I think the program is great, has a great future as public perception changes through advertising and acceptance. It will be a wonderful resource and tool in the construction of housing projects in New Zealand".

"It's really good to have an industry organisation such as BRANZ involved in eco-building".

3. RECENT DEVELOPMENTS

3.1 International developments

There has been a proliferation of green auditing schemes, since the release of the BRANZ *Green Home Scheme* in late 1997. The USA has probably the highest number of green building initiatives, which have been initiated, funded, developed, administered and maintained by a raft of diverse interests (Barnett, 2000 and Matthew, 2003).

Overviewing each auditing scheme is beyond the scope of this study report. Instead, the spotlight is narrowed to two schemes of special importance – Building Research Establishment's **EcoHomes** (www.bre.co.uk) – the latest incarnation of the BREEAM (Homes) on which the GHS was originally based; and Australia's upcoming web-based **BASIX** tool – which holds the most promise for success in terms of smart features and approach. Both of the tools will be examined in terms of possible influence on the revised GHS. The focus of analysis for each scheme will be its technical aspects, rather than its management/operational characteristics.

3.1.1 EcoHomes – the UK tool

EcoHomes provides ratings for new, converted or renovated homes. This differs from the BRANZ GHS, in that **EcoHomes** buildings can be assessed at a variety of stages and be a variety of types (stand-alone houses, apartments and sheltered accommodation). The assessments are undertaken by licensed auditors who are trained and monitored by BRE. A 'workbook' is issued for each **EcoHomes** assessment – which is, in effect, a combination of the GHS *Assessment Worksheets* and the GHS *Designers Guide*. Seven categories are given in their March 2002 version of the workbook (available as a pdf document through the internet until May 2003). The categories are: Energy, Transport, Pollution, Materials, Water, Land Use and Ecological Value, Health and Wellbeing. Each of these categories has several sub-issues associated with them. Each sub-issue and its implications for the revised (2003) edition of the GHS will be overviewed to:

- see how the scheme (and the associated environmental knowledge) has progressed to ensure that the updated GHS is current with today's thinking on environmental matters
- provide discussion on the general direction in which the future GHS should progress.

The questions to answer are:

- Is the current GHS reflective of the New Zealand state-of-play (circa 2003), in terms of sub-issues addressed and their treatment, compared to **EcoHomes**?
- If there are sub-issues which need reconsidering for the revised GHS, how are they best addressed, given the differing cultural, social, environmental and construction methods[3] ?

A summary of how the latest iteration of **EcoHomes** compares with the GHS (1997) follows:

Table 2: Comparative assessment of two domestic environmental auditing tools

[3] Several new sub-issues introduced into the March 2002 version of **EcoHomes** are already contained in the 1997 GHS. Examples include: building envelope performance, provision of a drying space, and public transport. Note that although these sub-issues may be named differently, their aims and method of assessment are often almost identical.

COMPARISON OF NZ AND UK AUDITING SCHEMES FOR DOMESTIC BUILDINGS				
Issue	**Sub-issue**	**Treatment in EcoHomes[4]**	**Treatment in 1997 GHS[5]**	**Comments**
1. Energy	CO_2 production due to energy consumption	Prescriptive through their domestic energy assessment tool	Indirectly and descriptively through thermal and appliance efficiency	NZ method reflects compatibility with calculation tools
	Building envelope performance	Based on incremental improvements over their Code requirements	As for **EcoHomes**	
	Provision of drying space	Allocation for clothesline	As for **EcoHomes**	
	Eco-labelling goods	Whiteware goods which have minimum energy efficiency performances	N/A	Beyond design considerations
	External lighting	For security and energy efficient lighting	Similar to **EcoHomes**	
2. Transport	Public transport local amenities	Proximity to transport node	Similar to **EcoHomes**	
	Cycle storage		Not considered	Consider for 2004?
	Local amenities	Proximity to local amenities	Similar to **EcoHomes**, with same cut-off distances	
	Home office	Provision of adequate space and facilities	Not considered	Consider for 2004?
3. Pollution	HCFC emissions	ODP of zero for all insulants	N/A for NZ as none are	
	Low NOx concentration	Low NOx emitting boilers	N/A as almost never used in NZ	
4. Materials	Inclusion of timber	Sustainably sourced or recycled	Similar to **EcoHomes**	
	Storage of recyclables	Provision both internally and externally	Similar to **EcoHomes**	
	Environmental impact of materials	Using 'green guide to specification methodology'	Not possible	No LCA-based tool available in NZ yet[6]
5. Water	Water usage	Based on number of occupants, using bed space as a proxy	Based on water appliance choices	
6. Land Use	Ecological value of site	Eco-audited sites/protecting existing features	Not considered	Not as important in NZ, as lower population density
	Change in eco-value of site	Minimise reductions in eco-value of site by counting plant species by area	Not considered	Issue too complex for it to be adapted for use in NZ
	Building footprint	Total floor area by land area	Not considered	Dictated by TLA's in maximum allowable floor coverage area
7. Health and Well-being	Daylighting	Daylight design meeting code criteria for kitchen and all other habitable rooms	Not considered	No NZS-specific tools which have any merit
	Soundproofing in party walls and between floors	A combination of descriptive and prescriptive measures defined	Not considered	Current NZBC requirements considered adequate
	Private space	External space which is at least partially private	Not considered	Consider for 2004?

EcoHomes differs from BREEAM (homes) significantly by:

- Being broader in the issues assessed, resulting in about 24 'themed' issues (within the seven categories) being examined, either descriptively or prescriptively. This results in a

[4] *EcoHomes – the environmental rating for homes*. March 2002. Building Research Establishment. Downloaded from the www.bre.co.uk site as a pdf document, in March 2003.
[5] *Green Home Scheme – Designers Guide*' August 1997. BRANZ. Wellington.
[6] BRANZ and Victoria University are making inroads into such a tool (Storey, 2002) – but a commercial product is still some way off.

very expansive worksheet document (all of 78 pages!) which is well integrated into their prescriptive UK Codes.

- Becoming more reliant on non-standard/code support documentation (such as the *Green Guide to Housing Specification* (Anderson and Howard, 2000), which was developed in concert with their National House Building Council).
- Addressing the more complex/contentious issues (such as in-depth environmental material impact, daylighting and sound insulation) which are considered leading-edge for this type of tool.

Discussion of potential issues

In Table 2's Comments column, four sub-issues were highlighted as being possible for the inclusion in the GHS '03 update. Their potential for inclusion will be examined in light of whether it is addressing a problem relevant to New Zealand, and if so, whether it can practically be implemented at the final design stage.

SUB-ISSUE #1: CYCLE STORAGE

The **purpose** is "to encourage the wider use of bicycling as transport and thus reduce the need for short car journeys, by providing adequate and secure cycle storage facilities".The **credit requirement** is "the provision of adequate storage of cycles for each dwelling. This is determined by the number of bedrooms within a dwelling e.g. 1-2 bedroom flat/housing – storage for one cycle" etc.

Comment: cycling is an issue which is probably more important for attached/town and apartment housing, which are less common in New Zealand – although definitely becoming more popular in the Auckland region (PCE, 1998). New Zealand's GHS is targeted more at the stand-alone (detached) market, where space is not at such a premium with built in or attached garages being the norm.

SUB-ISSUE #2: HOME OFFICE

The **purpose** is "to reduce the need to commute to work by providing residents with the necessary space and services to be able to work from home". The **credit requirement** is "1 credit given for the provision of a space which allows the occupants to set up a home office in a quiet room, which has as a minimum:

- 2 double sockets and 2 telephone points (or double telephone point) or equivalent (in the case of broadband, cable network etc)
- a window
- adequate ventilation either through an openable window or with alternative ventilation such as a passive stack etc
- minimum size to allow a desk, table for computer and filing cabinet to be installed, with space to move around and open the door".

Comment: It is generally recognised that having a place to work from at home has many environmental benefits – in terms of easing traffic congestion, reducing the use of resources and reduced production of greenhouse gases etc. Certainly, these issues are a problem for New Zealand. However, the requirement for an office seems to be indistinguishable from the requirements of a study, and is entirely dependent on user behaviour. Although some existing GHS issues are dependent on user behaviour as well (e.g. such as credits for 'close proximity to public transportation' or 'having provision for a compost system for organic wastes'), the author thinks that this initiative could be too easily undermined. For now, it is suggested that we do not include this issue for New Zealand.

SUB-ISSUE #3: PRIVATE SPACE
The purpose is to "improve the occupiers' quality of life by providing a private outdoor space". The credit requirement is "1 credit for the provision of outside space that is at least partially private".

Comment: This issue seems very vague, with the environmental benefit not obvious. Until New Zealand starts moving into densified settlements, the author thinks that this is unnecessary.

SUMMARY
It seems that most of the new issues addressed by **EcoHomes** are those which are reflective of a densely populated urban space with terraced/duplex-type accommodation, which is more prevalent in the UK. This is true for the sub-issues on 'cycle storage', 'home office', 'eco-value of the site', 'soundproofing' and 'private space'. In New Zealand, space (or the lack of it) is not considered such a high priority yet. However, this view is rapidly changing for some urban and peri-urban areas, in particular parts of Auckland, Wellington and Christchurch (PCE, 1998). The question is, however, how does one judge what is meant by "at least partially private"? Currently, the author sees the 'Private space' issue as being too vague to be assessed easily and rigorously, and therefore it would be premature to include these sub-issues in this 2003/2004 revision. However, each of these sub-issues should be revisited in the next GHS update.

3.1.2 BASIX – the Australian tool

In late 2002, a new planning tool which holds particular interest for New Zealand was being developed in Australia (www.duap.nsw.gov.au). It is a sustainable planning and building tool (called **BASIX**) and is designed to help architects, builders and developers 'demystify and standardise better urban development practices'. Uniquely, this planning tool is being launched as a web-only tool, which will be applicable to all common residential dwelling types. It has two key parts, the **building** and **context** components. The **building** component assesses the response of a building proposal to the opportunities presented by the context of the site and its infrastructure. It encourages developers to address environmentally appropriate energy, water efficiency, building materials and landscaping. The **context** component factors in land use, transport, stormwater systems, water supply and energy infrastructure issues.

The tool was developed in association with Councils and environmental organisations such as the NSW Environmental Protection Authority, Sydney Water, Resource NSW, the Sustainable Energy Development Authority, the Department of Public Works and Services and EnergyAustralia.

The key components that make this tool particularly attractive are that it is:

- very practical and underpinned by actual (hard) data, making it more 'industry-friendly' as a result of examining numerous resource use and planning issues
- web-based for:
  - potentially easier input of data
  - easy updating of data
  - ability to have complex algorithms working 'behind the scenes', for predicting energy and water use, for example
  - fast and easy remote assessment of projects
- able to rate a range of development proposals
- flexible, able to be easily adapted for regional differences.

In addition, developers see the tool as providing:

- reduced compliance costs through simplifying the building planning process for all dwelling types
- a clear definition of 'sustainable housing' for all stakeholders
- a consistent and all-inclusive information source
- comprehensive sustainability benchmarks for all stakeholders
- reduced environmental and social impacts of housing development.

There are nine **BASIX** indices (taken directly from the website):

- **Site** – recognises the sustainability benefits of urban renewal over greenfield developments. Encourages minimal site disturbance while maximising landscape and biodiversity.
- **Social** – promotes affordable, adaptable and accessible housing. Encourages mixed use development.
- **Transport** – encourages a reduction in car-parking provision where good public transport is available and accessible. Promotes safe and accessible facilities for all walking, cycling and public transport users.
- **Water** – recognises the reduction in potable water demand associated with the application of water efficient fittings and appliances. Recognises value of substituting mains potable water with harvested or recycled water, where appropriate.
- **Stormwater** – recognises the performance of on-site quantity and quality control measures in relation to downstream infrastructure and natural systems.
- **Energy** – recognises the reduction in energy use and greenhouse gas emissions associated with the application of energy-efficient fittings and appliances. Promotes the use of renewable energy.
- **Waste and recycling** – promotes waste minimisation through well designed developments. Promotes reuse and recycling of materials and buildings.
- **Materials** – recognises the environmental impact associated with production, transport and use of building materials. Encourages material reuse and recycling.
- **Indoor amenity** – promotes naturally ventilated and day-lit buildings above mechanical ventilation and lighting systems. Encourages material selection that minimises indoor air pollution.

The author believes the future lies in this type of auditing scheme, where it forms part of an integrated planning tool for TLA's that can also be used for assessment purposes. Although this tool has been pilot tested, it has not been formally released at the time of writing (December 2003). Obviously, this is early days yet in terms of proving its value, but it does look very promising. Discussions have been ongoing with its developer – Bruce Taper – on the possibility of it being developed in New Zealand in the near future. In addition, it seems that government agencies (such as EECA) and the more environmentally conscious TLA's (City Councils) are viewing it with considerable interest.

BRANZ should be keeping abreast of the developments of this tool, especially those associated with its uptake/acceptance by industry and homeowners. Ultimately, this is the direction that future iterations of the BRANZ *Green Home Scheme* should be heading towards in the longer term. To this end, BRANZ is considering more formal networks and links with

the eco-minded TLAs, to assist its development. Already, informal networks with TLA's and central government agencies, as well as consultancies, such as LandCare Research (who have been investigating the potential for low impact urban design tools) have been established.

3.2 National developments

Since its launch in 1997, there has been much progress in the development of national eco-building-related initiatives which impact on the BRANZ *Green Home Scheme*. The bulk of these initiatives are in the form of tools, guidelines or strategies. Because of the surfeit of developments in this area, initiatives have been grouped into: the building-specific (focusing almost exclusively on good building design); the more holistic urban design tools; and broad (national) strategies.

In terms of *building-specific tools* and publications, of particular note are:

- the collaborative *Easy Guide to Eco-Building* booklet (BRANZ et al, 2000)
- *Designing Comfortable Homes* (EECA and CCANZ, 2001)
- *Passive Solar Design for New Zealand Homes* (EECA, 2000)
- *Insulation of Lightweight-Framed and Solid Timber Houses* (SNZ, 2003)
- The domestic thermal design tool ALF3 (Stoecklein and Bassett, 2000)
- *Being a Climate Friendly Kiwi – at home and at the office* (BRANZ, 2002)
- a draft Climate Change Sustainability Index for Houses (BRANZ, 2000)
- CRESA social research on the way new homeowners select houses (Saville-Smith, 1998).

In terms of the more holistic *urban design tools*, which consider the building in its relationship to its surrounding, examples from the past five years include:

- *Developers' Design Guide* (Waitakere City Council, 1998); guidelines for residential subdivision and medium density housing
- *Good Solutions Guide* (North Shore City Council, 2001); guidelines for intensive residential developments
- *New Housing in Living 4 Zones*, *New Housing in Living 3 Zones* and *Large Buildings in Lower Density Living Zones* (Christchurch City Council, 2001; 1999; 1999 respectively); design guides for houses in central and suburban Christchurch
- *People, Places, Spaces: a design guide for urban New Zealand* (Ministry for the Environment, 2002); guidelines that provide a broad overview of urban design processes and principles
- *Subdivision for People and the Environment* (SNZ, 2001); guidelines and design information to assist environmentally sensitive land development.

In addition, central government has recently released a number of *national strategies* which impact on the built environment, most specifically, the National Energy Efficiency and Conservation Strategy, the Waste Strategy (2002) and the Transport Strategy (2002). All of these strategies have major implications on how buildings are designed, built, managed and disposed of at the end of their lives.

All these initiatives influence the GHS operation in some way. However, detailed examination of tools will be limited to those the author sees as being of particular significance to the

GHS's management and operation. These are: the BRANZ *Climate Changes Sustainability Index* tool, the recently released *Insulation of Lightweight-Framed and Solid Timber Houses* (SNZ, 2003) and the CRESA research on the influence of climate change on buildings (Saville-Smith, 1998).

3.2.1 The BRANZ Climate Change Sustainability Index tool

The Climate Change Sustainability Index (CCSI) resulted from BRANZ research into what influence climate change is likely to have on buildings (Camilleri, 2000). The CCSI can be used to assess the vulnerability of a house to the effects of climate change, as well as the contribution of a house to climate change from greenhouse gas production. The index is computed using basic design features, local climate and geographical factors. Only those climate change-related aspects that were identified as both likely and significant were included as part of the index.[7] These are: space heating, water heating, overheating, cyclones, inland flooding and coastal flooding (see Table 3 below).

Table 3: CCSI-related aspects and method of assessment (based on Camilleri, 2000)

Aspect	Method of assessment	Degree of difficulty to apply
Space heating	Applied ALF3 combined with a look-up table on heating appliance efficiencies	High
Water heating	Look-up tables	Simple
Overheating	ALF3 references (rather than formal calculations) combined with a look-up table	Minor
Cyclones	Site latitude	Simple
Inland flooding	Annual accedence probabilities dictated by TLA's	Minor
Coastal flooding	Individual site topography	Simple

Although the CCSI only requires basic design features, it does necessitate the use of several extra look-up tables and calculations procedures, as can be seen from Table 3. None of these extra references are required for the present edition of the GHS assessment procedure. The BRANZ ALF3 thermal design tool (Stoecklein and Bassett, 2000), necessitates an investment of just over $100[8] (plus training time), before the user can become familiar with it.

The feasibility of three options of integrating the CCSI into the revised GHS is explored:

Option 1: Incorporate the CCSI 'as is'
If the CCSI tool were to be incorporated wholesale into the GHS, it is unlikely that it would be used by the majority of the assessors, in part due to its 'hidden cost' (the ALF programme) which would be a barrier even though climate change-related aspects are seen as being important (refer survey Q6). A precedent can be found in the existing scheme's requirement for calculating the whole building's thermal performance (see discussion of survey questions Q7, Q8 and Q9 in Section 2.3.1). In addition, these extra requisites would be rather time-consuming, shifting the total assessment time to over an hour. This hour barrier is seen as a threshold limit for an assessment procedure of this nature. This example highlights the problem of paper-based design tools. Anecdotal evidence suggests that these are good for simple, checklist-type solutions but are not so useful for the more complex applications.

Option 2: Incorporate the CCSI in a truncated form
The alternative strategy is to incorporate those issues that have been classified as 'simple' (refer Table 3), requiring only look-up tables. Certainly, the GHS has always striven to be

[7] The exception to this is tropical cyclones which were included because of the potential for damage is so large.
[8] A demonstration version of ALF3 can be downloaded from the internet for free. However, saving (and therefore comparing) designs is not possible with this download option.

easy to use, yet providing more than a cursory examination of eco-issues. However, this creates conflicts within the existing GHS assessment framework, due to overlaps in the assessment areas. For example, hot water heating has already been accounted for within the 'appliance efficiency' issue. This leaves only the *cyclones* and *coastal flooding* issues. Including only these those two issues seems a little arbitrary, given that all five issues has been identified as both significant and likely (Camilleri, 2000). The other concern is that both issues are beyond the influence of both the designer and the homeowner, and therefore is likely to meet with resistance by both (like the transport issue).

Option 3: Wait for a the GHS to become a web-based system
There is the possibility of incorporating the GHS into a web-based programme in the next GHS update, where tools that need background computation (e.g. the CCSI) can be more easily integrated. To a large extent, this will depend on the success of the newly developed **BASIX** tool (in Australia) which also makes use of a clean and user friendly interface that has complex algorithms and look-up charts underlying it. This seems the best option at present.

SUMMARY
It is recommended that the BRANZ CCSI is left out of this GHS revision. In the next revision, the complete CCSI tool could be integrated, providing the GHS becomes an internet-based system or computer-based program. This alternative ensures easier adoption and uptake by users, and has the added advantage of being updated easily.

3.2.2 The new higher performance insulation standard

The recently released Publicly Available Specification (PAS) *Insulation of Lightweight-Framed and Solid Timber Houses* (SNZ, 2003) specifies two main levels of insulation above the requirements of NZBC's Clause H1. These are categorised as '**better** insulation and better windows' and '**best** insulation and windows'. These categories are said to "… *provide further benefit in … reduced heating capacity requirements and improved occupant comfort*". The increases in insulation levels necessary for the 'better' and 'best' categories are considerable – higher than even the highest level set by the BRANZ *Green Home Scheme* (refer Table 4) – being thermally comparable to the 'good practice' and 'best practice' thermal values proposed in the *Designing Comfortable Homes* (CCA, 2001) document.

Table 4: Comparative thermal requirements of two design assistance tools

	Current BRANZ *GHS* set insulation levels for all climate regions		NZS PAS 4244 set insulation levels, averaged over all climate regions	
Performance	**'Low' level**	**'High' level**	**'Better'**	**'Best'**
Whole House R Value[9]	N/A	N/A	40-89% or more above Code	90% or more above Code
Whole House Heat Loss Reduction[10]	10%-19% below Code	20% or more below Code	approximately 35% below Code	approximately 50% below Code
Credits Available	3 credits	6 credits	N/A	N/A

BRANZ would like to support NZS PAS 4244 and integrate it into the GHS, as it:

- is based on actual thermal modelling carried out by an independent provider, adding real support for the specifications given
- assists the designers/specifiers/new homeowners by providing simple and practical building solutions to achieve the insulation values required

[9] This is a weighted R value average, based on a 'typical' house with a floor/roof area of 33% of the total area, a wall area of 24%, with the remaining area for windows and averaged over the three climate zones.
[10] This uses the same 'typical' house dimensions as for the previous footnote.

- is aligned with the thermal values proposed for solid construction in the *Designing Comfortable Homes* (CCA, 2001) document
- provides useful information on indicative reductions in space heating requirements and associated comfort benefits as a result of these increases in insulation, in lay terms
- supports the recent National Energy Efficiency and Conservation Strategy, which is part of central government's foundation policy series.
- provides the GHS with an independent, practical and scientifically based rational for positively contributing in the areas of climate change and non-renewable resources

In essence, the NZS PAS 4244 is seen as an essential step in providing solid specification guidance on the selection of elemental insulation levels that will dramatically improve energy efficiency, comfort and health, through simple schedules, all underpinned by actual modelling. However, its wholesale application into the GHS will lead to frustration, due to the inflexibility of its scheduling systems. For example, trade-offs between elemental R values cannot effectively be accomplished within its tabular format. Nor can the assessment of multiple composite building elements with differing R-values be directly carried out. Both these issues can be addressed within the GHS's existing framework.

Given the global, national and indoor significance of whole building thermal efficiency and its unanimous recognition by those surveyed as part of the GHS review, it was decided that a minimum level of thermal performance should be mandatory for all GHS rated homes. This is, in part, a necessary response to the GHS assessments so far, which have not 'walked the talk' in terms of good passive thermal design. It also reinforces the message that the GHS (version 2004) sees substantially better than Code insulation levels to be fundamental (and necessary) for good 'green' design.

It seems logical that this minimum mandatory level should be set at the NZS PAS 4244 "Better" level (where the Heat Loss is 35% below that required by NZS 4218: 1996). The next higher (but this time voluntary) level to be set at the NZS PAS 4244 "Best" level (where the Heat Loss is 50% below that required by NZS 4218: 1996). One method of incorporating these higher insulation levels, into the proposed revision of the GHS *Assessment Worksheets*, follows. It should be noted that, for the sake of simplicity and clarity, the supporting documents – NZS PAS 4244 and *Designing Comfortable Homes* – were not referred to directly. This was done also because to flexibility reasons – e.g. in trading off elemental R values or where elemental components have more than one composition – and the heat loss equation is the best method of addressing this.

As can be seen in the following Worksheet Section, whole building thermal heat loss reduction targets of 35% (mandatory) and 50% (voluntary) when compared to current code requirements have been incorporated. Achieving the 35% targets attains 6 credits, while 9 credits can be achieved for the reducing the whole building heat loss $\leq$ 50% of current Building Code requirements. Previously, a 3 credit level was available, while the 9 credit level was not. This revision recognises the substantially higher thermal specification requirements, the improved knowledge base on passive design, and the reduction in available credits elsewhere in the GHS. As changes to NZBC's H1 Energy Efficiency are made, the targets for the GHS will be upgraded accordingly.

Detractors may find the revision too stringent. However, passive solar design (of which high insulation is a key component) is generally recognised as being the foundation of good eco-design and has no known negative environmental consequences (EECA, 2000). Now, for the first time, New Zealand has two practical and descriptive guidelines on how to achieve good levels of insulation and what targets levels should be adopted, with quantifiable implications

in terms of non-energy use-related benefits. The opportunity to incorporate them into the GHS should not be missed.

Worksheet Section: Upgraded Thermal GHS Assessment Requirements

PART ONE: Thermal Efficiency

- **[Up to 9 credits] for insulating the house to a level significantly beyond that required by NZBC Clause H1-Energy Efficiency.**

Note that:

- the first six credits are mandatory
- the enhanced thermal performance levels are the same for both solid and non-solid construction, i.e. a reduction in whole building Heat Loss of **at least** 35% for 6 credits and **at least** 50% for 9 credits, compared to NZS 4218: 1996 requirements.

STEP A

Refer to NZS 4218: 1996 *Energy Efficiency*. Using the *Calculation Method* in Appendix C (see Equation 1 below), find the heat loss (HL) values for your proposed building and the reference building:

Equation 1: *Calculation Method* (NZS 4218: 1996)

$$HL_{Proposed} = \frac{(\quad)A_{Roof}}{(\quad)R_{Roof}} + \frac{(\quad)A_{Wall}}{(\quad)R_{Wall}} + \frac{(\quad)A_{Floor}}{(\quad)R_{Floor}} + \frac{(\_\_\_\_)A_{Glazing}}{(\_\_\_\_)R_{Glazing}}$$

$HL_{Reference}$ = as appropriate for your: (i) building type (ii) climate zone (iii) glazing area

STEP B

Determine the number of credits achievable by the proposed building design, using Equations 2 and Equations 3 below. If the mandatory 6 credits are not achieved, then the design must be revised.

⏩ For the **mandatory 6 credits:** i.e. when the proposed building is at least 35% better thermally, than that required by NZS4128: 1996. Check using the following equation:

$$\mathbf{HL_{Proposed} \leq 0.65 * HL_{Reference}} \qquad \text{Equation 2}$$

⏩ For **9 credits:** i.e. when the proposed building is at least 50% better thermally, than that required by NZS4128: 1996. Check using the following equation:

$$\mathbf{HL_{Proposed} \leq 0.5 * HL_{Reference}} \qquad \text{Equation 3}$$

For guidance on how to achieve these higher performance levels, refer to *Insulation of Lightweight-Framed and Solid Timber Houses* (SNZ 4244, 2003) and *Designing Comfortable Homes* (Cement and Concrete Association, 2001).

The possibility of incorporating a similarly scaled credit system for thermal **mass** was also investigated, as part of the revision. Currently, a total of 4 credits can be gained for the appropriate use of thermal mass in the GHS.[11] It was found that the relationship between the amount of thermal mass and comfort levels[12] is consistent: increasing the amount of mass results in an increase in comfort levels, even as the insulation level changes (see Table 5).

Table 5: Comfort versus the amount of thermal mass

Changes in comfort levels[13] for houses with medium glazing levels (CCANZ, 2001)				
Region	Insulation level	Low mass	High mass	Comfort change
Auckland	Good	81%	91%	↑
	Best	86%	91%	↑
Wellington	Good	68%	75%	↑
	Best	73%	81%	↑
Christchurch	Good	57%	62%	↑
	Best	63%	68%	↑

However, this doesn't hold true for the relationship between the amount of thermal mass and the resulting heating required. Thus, increasing the amount of mass does not necessarily reduce the required heating levels, as shown in Table 6.

Table 6: Thermal mass versus the amount of required heating

Changes in required heating levels[14] for houses with medium glazing levels (CCANZ, 2001)				
Region	Insulation level	Low mass (kWh)	High mass (kWh)	Energy use change
Auckland	Good	2746	2708	↓
	Best	1453	1023	↓
Wellington	Good	5455	6041	↑
	Best	3869	3327	↓
Christchurch	Good	8455	9667	↑
	Best	6398	5901	↓

For the incorporation of any issue into a tool such as the GHS, any 'rules of thumb' must hold nearly all the time (Jaques, 2000). The strategy for incorporating a more detailed examination of thermal mass within the GHS is therefore problematic, given the energy-use related inconsistency displayed in Table 6. Thus, in the interim, the system for addressing (and rewarding) the appropriate use of thermal mass as a temperature moderator will remain unchanged.

[11] 3 credits for the use of an insulated and uncovered concrete floor slab and 1 generic credit for designs which incorporate an extra solar design technique such as a trombe wall.

[12] Note that an unheated building is not a complete indicator of comfort as it doesn't measure the building's response to a change in temperature.

[13] Comfort is simply defined as the percentage of time in which the ambient (indoor) temperature is between 16°C and 26°C.

[14] Required heating is defined as the heating required between 7am and 11pm, for set-points of 16°C for the bedrooms and 20°C for the living areas.

3.2.3 The CRESA study

So, what light can be shed on the reasons for the low uptake of the GHS, where still, after five years, only dozens rather than hundreds of houses have been formally assessed? In part, this may be due to the low number of newly built eco-homes. The author estimates that less than 1% of all new house starts (i.e. less than 220 houses per year) could be considered 'reasonably eco-competent' – i.e. incorporating features that would achieve at least a 'good' GHS environmental performance rating. Other clues can be also be derived from the GHS survey itself (specifically the answers to **Q3**, **Q4** and **Q13**).

Further indicators gleaned from related social research, for example, that done by CRESA on the factors hampering the uptake of non-traditional building design, were carried out at the time of the GHS launch. Saville-Smith (1998) examined the extent to which the building industry has the capacity or the inclination to respond to the demands of environmental issues. In this case, the environmental issue being examined was climate change. A total of 314 New Zealand home-owners (i.e. consumers) of new and recently renovated homes were surveyed.

The major barriers to non-tradition (in this case 'green') design included:

- the difficulty in securing sustainably-related design, material and service information
- the fragmented nature of the building industry, making information dissemination and changes in the current situation difficult.[15] Included in this are changes such as the Building Act Review, the BIA restructure etc
- consumer-mentality, where environmentalism is equated with compromise, hardship and alternative lifestyles; or simply the lack of interest/importance in environmental concerns.

In addition, there was a real lack of understanding of environmental cause and effect. Only about 4% of the respondents in the CRESA study identified construction industry activity as a possible contributor to climate change (hence no understanding of the link between energy usage and the effects it has on the global climate).

Most of the industry participants suggested that there was little opportunity to strongly advocate 'green' products, features or technology, unless:

- it could clearly be substituted without significant price impacts, or
- a prospective consumer had expressed a specific desire to prioritise it for environmental reasons, or
- the client had a 'taste' for that feature.

Where those conditions existed, then some practitioners would advocate for a green approach. However, there was still the notion that green products were:

- not a priority for consumers because the features were not obvious
- green approaches to home building tended to be perceived by consumers as more costly than 'traditional' approaches to building.

Three proposals for the construction sector to overcome the barriers to addressing environmental issues were:

- promoting environmental friendly sustainable housing to consumers

[15] This, naturally, has important implications for any publicity campaign of the GHS.

- providing information to consumers about green housing opportunities, products and associated costs
- developing affordable green products.

These themes have been previously seen in the GHS survey responses.

3.2.4 Miscellaneous developments and feedback from assessors

In addition to the previous suggestions, other text within the body of the assessment documentation needs to be examined and updated. The main items of concern along with their implications are listed:

ITEM #1: New Environmental Choice Specifications
Environmental Choice New Zealand (ECNZ) has released an environmental specification for resistive-type insulation. It has been accommodated under the existing assessment framework, with the addition of wording (and credits) to include insulation materials which have a low environmental impact. 'Low environmental impact' is defined as being where the material has an ECNZ (or equivalent third party assessment) certification.

Currently, there is also provision for three (discretionary) credits to be awarded for the "significant use of any other building-related product which has a low environmental impact". This issue also could include the recently developed ECNZ plasterboard specification (#EC-19-01[16]) although at the time of writing, no manufacturers had picked it up.

IMPLICATIONS: Alter the GHS *Designers Guide* accordingly (see Table 9).

ITEM #2: Two contact details are now out of date.
There is reference to old contact details for Environmental Choice New Zealand and the publication *House Design Publications.*

IMPLICATIONS: Alter the GHS *Designers Guide* accordingly (see Table 9)

ITEM #3: New NZBC requirements for installing smoke alarms in all new houses.
The BIA implemented amendments to Clause F7 of the NZBC, coming into force on 24 April 2003, requiring appropriate means of detection and warning for fire in each new household unit. Smoke alarms may be battery powered and are not required to be interconnected. They also must be installed according to specific rules. Currently, the GHS assessment has credits for including both mains powered and stand-alone battery powered smoke alarms.

According to BIA studies (1998), there are significant benefits in terms of the effectiveness when using a sealed stand-alone unit with a long-life battery (which lasts about five years) than when a standard battery (which lasts about one year) is used. This alone improves the effectiveness from an estimated 80% to 98%. By specifying this extra requirement (i.e. such as long-life batteries) this issue can stay in the GHS *Designers Guide*. However, text changes are necessary for both the GHS *Designers Guide* and the GHS *Assessment Worksheets*.

IMPLICATIONS: Alter the GHS *Designers Guide* and GHS *Assessment Worksheets* accordingly (see Table 9).

ITEM #4: New timber treatment requirements.
The GHS *Designers Guide* refers to the old timber preservative treatment standard (NZS MP3640) which has been replaced with NZS 3640: 2003 (which defines the hazardous classes and specifies the type of treatment needed for various end uses), and NZS 3602: 2003 which

[16] www.enviro-choice.org.nz.

covers timber and wood based products for use in buildings. The major changes to timber treatment requirement, mainly in response to the weathertightness problems, are to external wall framing, skillion and low slope roofs, balconies and decks. The requirements for timber treatments are now more involved, although identification of the type of treatment will be easier. The structural timbers still not requiring treatment are: roof and ceiling framing, low risk wall framing and intermediate floor framing.

It is acknowledged by some that timber treatment has been somewhat unfairly saddled with the blame, as a consequence of the recent weathertightness problem. One of the outcomes of this is that houses built of untreated framing have a slight stigma attached to them with potential buyers more wary – and are perhaps harder to sell as a result.

Another issue to account for is the development of less environmentally harmful timber treatments and methods. Some appear to be less environmentally harmful than the existing methods and treatment systems, however, more investigation is required to ascertain the claims.

Due to this increased complexity of the Wood Preservatives issue, it was decided to re-look at its original purpose and intent, which was "to reduce the unnecessary use of wood preservatives while maintaining an appropriate level of timber durability". There is no reason why this ideal should change. However, the approach needs to be managed differently, so the new wording becomes:

Credit Requirement
5 credits for using sustainably managed New Zealand grown untreated timbers for all structural work (i.e. roof and ceiling framing, intermediate floor framing and low-risk wall framing) to the relevant codes and standards.

The Purpose and Method of Assessment remain unchanged. Note that the number of available credits has increased reflecting the increased difficulty in achieving this issue.

IMPLICATIONS: Alter the GHS Designers Guide and GHS Assessment Worksheets accordingly (see Table 9)

ITEM #5: Fine Tuning of the Water Economy issue to be more inclusive.
The intent of this issue is to increase the awareness of water's importance as a resource. The broadening of the scope of the water economy issue was requested by designers and assessors, to acknowledge independent systems which were not reliant on town water, making use of rain, river or ground-bore supply. This would require changes to the:

1. Purpose – now 'To encourage the on-site harvesting of water and to discourage water wastage, since water is a valuable resource'.

2. Credit Requirement:
   a. substitute the initial 6 credits on having a rainwater collection tank with '***5 credits*** *for the inclusion of a water collection tank as a supplement to town water supply…'*
   b. *'**8 credits** for the harvesting local water (i.e. rain/river/ground-bore) supplies so that no mains water connection is required*'.

IMPLICATIONS: Alter the GHS *Designers Guide* and GHS *Assessment Worksheets* accordingly.

ITEM #6: Delete the timber veneers sub-issue, as part of the Natural Resources and Recycled Materials issue. This issue was considered to be not pragmatic enough to be workable and

environmentally not significant enough to be worth the effort. With hindsight, the author has to agree.

IMPLICATIONS: Alter the GHS *Designer Guide* and GHS *Assessment Worksheets* accordingly.

ITEM #7: The Non-Gaseous Indoor Pollutants issue is being carried out as a matter of course in most instances, as the higher performing (HEPA) vacuums are becoming standard. Therefore, no encouragement is now necessary in the design guide. This is also a reflection on the environmental significance of the issue.

IMPLICATIONS: Delete the GHS *Designers Guide* and GHS *Assessment Worksheets* accordingly.

ITEM #8: There doesn't currently exist in the GHS a way of rewarding innovation or initiatives from designers who go the extra distance in sustainable design. Example of this are – post occupancy monitoring of resource (water/energy/recyclables) use; construction specifically targeting carbon neutral approaches etc. This should be rectified.

IMPLICATIONS: The last GHS environmental issue could reward the design(er) for this – subject to a BRANZ audit. The wording could become:

"DESIGN EXCELLENCE

Purpose
To recognise designs which use especially innovative measures to aspects of design or embody integrated design approaches.

Credit Requirement
4 credits *for a significant innovative measure incorporated into the design which has not been accounted for previously.*

Method of Assessment
The design documents must show supporting information."

ITEM #9: The credits available for using concrete which contains industrial by-product. It seems that this criteria has now become the default situation in normal operating practices.

IMPLICATIONS: Delete issue from both GHS *Designers Guide* and GHS *Assessment Worksheets*.

ITEM #10: There were requests from designers to make the GHS Certificate more informative/descriptive. For example, showing which issues were targeted, the credits available and the credits achieved for that particular building, so a better understanding of what the issues are behind the scheme is possible for the uniformed.

IMPLICATIONS: The GHS certificate could have a thumbnail listing of issues sitting alongside the home's overall environmental performance rating. Only the major environmental would be given (for space reasons). Each major issue could have a check or bullet-point beside it, as appropriate, for a quick visual reference (refer **Error! Reference source not found.**). Note that only the five main environmental/health issues are examined – based on the number of credits available.

"This certificate is in recognition that this design, as originally assessed, considers environmental, health and safety issues. The main issues considered within this design are…":

Table 7: Possible addition to GHS Certificate (A)

Major Issues Examined	Sub-category achieved
Energy consumption	• Very good level of thermal insulation • Good room placement • Renewable energy assisted hot water • Efficient lighting in main areas
More sustainable materials	• Use of less harmful paint • Use of recycled materials
Water economy	• Self harvesting water – 30% supplied • Water reducing plumbing
Site selection	• Close to public transport
Indoor air quality	• Well vented bathroom • Well vented kitchen

Or, alternatively, the number of credits achieved could be detailed next an issue (refer Table 8). The wording could be:

"This certificate is in recognition that this design, as originally assessed, considers environmental, health and safety issues. The main issues considered, the actual credits achieved and the maximum credits available for this design are":

Table 8: Possible addition to GHS Certificate (B)

Issue	CREDITS	
	Achieved	Possible
Energy consumption	24	50
Sustainable materials	10	26
Water economy	15	29
Site selection	3	8
Indoor air quality	2	6

It seems that the main request from GHS designers was to have the more important issues spelled out on the certificate to act as a memory prompt/explanatory tool, as well as for transparency purposes, giving the viewer of the certificate a better appreciation of exactly what issues were met by the assessment process. For those purposes, **Error! Reference source not found.** probably is more effective and will be applied to the 2004 edition certificates.

Table 9: Suggested changes for updating the GHS Designers Guide

Item in original GHS *Designers Guide* (1997)	Page # in GHS *Designers Guide* (1997)	Revised for 2004 (and reasons where applicable)
'Energy and Environment Section …'	Inside cover	Change to "BRANZ Ltd, Built Environment Section …'
First Edition August 1997 etc	Page 1	Second Edition 2004 etc …
Acknowledgements	Page 2	Make it more generic, and target all those who contributed to the revised (2004) version
'About this guide' section – needs mention of mandatory credits in energy section.	Page 4	"The only mandatory issue is the first one on thermal insulation, in recognition of it being a cornerstone of good environmental design"
'How to Use this Guide' section	Page 4	Needs better reference to the worksheets/Accredited Assessors and a reworking of Step 4 and Step 5
Max. credits need to be revised	Page 5	Household Energy Consumption, Wood Preservative and Smoke Alarm sections need changing
2 credits for an "A" grade cylinder …	Page 7	Delete – this is now becoming standard practice
'6 credits for insulating …'	Page 7	'**Up to 9 mandatory** credits for …' (refer Section 3.2.2 for details)
Natural Resources and Recycled Materials … provided by the designer".	Page 8	Replace heading with: More Sustainable Materials; change the 'Purpose' accordingly
4 credits for the inclusion of concrete … Design Publications contact number	Page 8	Delete 4 credit option, as all cement achieves this; replace with correct number: ph 03 329 6311
1 credit for every 25% … used other than as an integral part … 1 credit for … specified veneers …	Page 8	Delete both sub-issues, due to practicality issues, environmental significance and changing standard practices
'Water Economy' issue	Page 9	An increase in the flexibility and applicability of the whole issue (see Section 3.2.4 for details)
Under Wood Preservatives section: where there are credits available for the use of untreated timbers for structural work	Page 12	**5 credits** for using sustainably managed New Zealand grown untreated timbers for all structural work (i.e. roof and ceiling framing, intermediate floor framing and low-risk wall framing) to the relevant codes and standards
Under Wood Preservatives section:	Page 12	Update the **2 credit** option to "**5 credits** for using sustainably managed … timbers for all structural work ... to the relevant codes …" (refer Section 3.2.4).
'Security Lighting' issue	Page 12	Delete issue – it is now becoming commonplace to have external sensor lights.
N/A	Page 13	New Issue: 'DESIGN EXCELLENCE'. To provide a catch-all category for those designs that go the extra distance. See Section 3.2.4 for details.
Reference to completed residence to be vacuumed using fine filter	Page 13 and 21	Delete: usually being carried out anyway and not now seen to be environmentally significant enough.
Reference to "TELARC", its address and product specification numbers which are now outdated	Page 14 and 21	Replace text with "Environmental Choice New Zealand", reword to be more informative, correct contact address and the latest product specification numbers for carpets and paints. Extension to include the new Thermal Insulation specification
Under 'Volatile Organic Compounds'	Page 14	Shifting all the sub-issues under this section to the new 'More Sustainable Materials' section (in page 8), where it is more appropriate. Include new issue: **3 credits** for the use of thermal insulation materials which have a low environmental impact
Reference to the requirement for installing stand-alone battery-powered smoke alarms systems	Page 12 and20	On page 12: modify to '**2 credits** for installing sealed, stand alone battery powered smoke alarm units'. On page 20: delete 'NZBC does not cover domestic smoke alarms …", and replace with "The NZBC now requires that there is an appropriate means of detection and alarming ..."

Note that the overall environmental performance envelopes (refer to page 15 of the original GHS *Designers Guide*) remain the same. This is because although there are fewer credits available, this is more than balanced by the amount of assistance available to achieve them.

4. CONCLUSIONS AND RECOMMENDATIONS

4.1 Introduction

This research sought to provide technical and operational input into the revision of the BRANZ *Green Home Scheme*. The specific objective was to provide GHS users with an improved tool, incorporating relevant and significant national and international developments, in terms of its operation and design, as well as to ascertain the functionality of the existing tool. This was performed through a combination of a formalised survey and study of building-related eco-initiatives occurring nationally and internationally.

In terms of the survey data, the following conclusions and recommendations represent the opinions of just less than 70% of the attendees of the GHS workshops. In terms of the national and international eco-building overview, the scope was limited to initiatives which were closely aligned with technical and operational aspects of the GHS.

4.2 Conclusions

1. In terms of the technical aspects, it seems that the GHS assessment is working well, specifically on:

   - issues addressed
   - information provided assisting designers to introduce eco-principles into the design process
   - eco-representativeness (i.e. environmental accuracy) of the assessment procedure.

   In terms of the operational aspects, the things that worked well included:

   - accessing BRANZ support
   - the usefulness of the support given
   - the medium of information provided (hardcopy rather than electronically-based).

   However, there were two strong operational aspects which respondents did not think worked well:

   – lack of publicity (very marked)

   – lack of ‘buy-in’ from the industry/public in general (a secondary theme, associated with publicity).

2. On the whole, it seems that the GHS is addressing ‘issues of significant environmental concern’. This is reflected of the respondents’ feedback on environmental issues within the GHS being viewed as either ‘important’ or ‘very important' (refer the first 10 issues in Table 10).

Table 10: GHS issues perceived as being either 'important' or 'very important'

Issue	Agreement (%)
passive solar design	100
appliance energy efficiency	96
eco-building materials	100
storage of recyclables	78
water economy/efficiency	100
proximity to amenities	74
composting on-site	85
indoor air quality	100
wood preservatives	100
safe storage of hazards	85
designing for climate change	78
reducing building material waste	96

Good passive solar design was agreed as the most important environmental issue. However, the assessments so far have shown that the majority of designers are not 'walking the talk' in terms of providing building designs which are significantly thermally superior to Building Code requirements.

3. Respondents see the need for more promotional and advocacy work necessary for the scheme to gain wider acceptance and credibility. This was repeatedly emphasised in the responses. This view is supported by parallel (social) research carried out nationally. This is seen to be the most critical issue facing the GHS currently, and one which the sustainable design community as a whole is trying to address.

4. The GHS is not being used for its original intent – rather, mainly for information provision on eco-design issues. This raises the question as to whether the GHS *Designers Guide* and/or the associated GHS *Assessment Worksheet*s should provide more issue-based solutions, guidance and general information.

5. There is support for the introduction of designing for climate change and construction-material waste reduction issues, in principle.

6. The most requested New Zealand-specific eco-building tool by respondents was a generic "*sustainable building sourcebook for use as a reference for practitioners*".

7. Surprisingly, the one issue that hardly surfaced was the (comparative) weighting of issues. This is comforting since this was seen during the scheme's development as being problematic, due to its subjectivity. Its acceptance is viewed as being critical for the GHS to be seen as a credible tool.

4.3 Recommendations

Technical aspects of the GHS:

1. Incorporate the 'Better' and 'Best Practice' performance levels, introduced within the new SNZ PAS 4244 (2003), into the GHS Thermal Efficiency issue. Convert the two performance levels ('Better' and 'Best' Practice) into effective Heat Loss benchmarks, to ensure flexibility of use through simple tradeoffs. Upgrade the number of credits possible for this issue and make the lower performance level mandatory for a GHS certificate. The upgrading details and the reasons for them are outlined in Section 3.2.2.

2. Adopt the proposed alterations to the GHS *Designers Guide* contained in Section 3.2.4(Table 7). These alterations are substantial enough that reprinting (or alternatively, an electronic pdf revision) of the Guide is required. A version number (highlighting the revisions and for product differentiation) should be displayed alongside the title. Send out revisions (either hardcopy or electronic) to all Accredited GHS Assessors.

3. The wholesale incorporation of the BRANZ climate change sustainability index tool (BRANZ, 2000) within the GHS would be premature, for practicality reasons. However, the inclusion of this tool should be redressed at the next GHS review, providing it can be integrated as part of a user-friendly calculation (i.e. preferably computer-based) tool.

4. There is a need for more education within the Assessor Accreditation Workshops on the importance of whole building thermal assessment. As part of this education, the calculation of elemental heat losses, as well as the sourcing options for the calculation of elemental R values, should be comprehensively covered.

Operational aspects of the GHS:

1. Sort out an integrated, well-targeted promotion campaign.

2. Keep a close watch on the development of Australia's **BASIX** tool, as this is setting the precedent for smarter and more integrated eco-related auditing tools.

3. Although the supporting document – the *Homeowners Guide* – was not investigated, it is recommended that it be replaced with something more informative with which the BRANZ/accredited assessors can better sell eco-building concepts.

CHECKLIST:

Have the original objectives of the investigation been met?

[✓] Improve the operation of the GHS via user feedback
[✓] Update and amend the GHS assessment documents concerning Building Code/regulatory changes, ensuring suggested additions are able to be implemented practically
[✓] Investigate the information needs of design practitioners
[✓] Ensure the net result of the scheme revisions do not significantly alter the level of difficulty in achieving a particular environmental performance grade.

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APPENDIX A: SURVEY COVER LETTER

24 February 2003

Dear _____

RE: The BRANZ *Green Home Scheme* Review

As someone who has participated in a BRANZ *Green Home Scheme* (GHS) Assessment Accreditation course, your views are important to our review of the BRANZ GHS.

Whether or not you have applied the GHS to a specific design, we would appreciate 10 minutes of your time to fill out the attached questionnaire. You are one of about 40 GHS course participants being asked to assist. The information you give us will remain anonymous.

Your contribution will be used, along with environmental-related tools, guidelines and national strategies developed since the first edition of the GHS was launched in late 1997, to ensure the GHS:

- provides the best approach possible to improving the environmental sustainability of our buildings, and
- meets the needs of practitioners.

A pre-paid, self-addressed envelope is enclosed for your convenience. We look forward to receiving your completed questionnaire by March 19th 2003.

If you have any questions, please contact me on (04) 2381367 or email: RomanJaques@branz.co.nz>.

Thank you for your help.

Regards

Roman Jaques
Building Environmental Scientist

APPENDIX B: SURVEY QUESTIONNAIRE

BRANZ Green Home Scheme (GHS)

Survey of Workshop Attendees '97 – '02

INTRODUCTION

*This review is for **all** those who have attended the Green Home Scheme (GHS) Assessment Accreditation course, whether you have:*

a) *applied the GHS formally to a specific design, and continued with a certificate*
b) *applied the GHS informally, for example as an environmental design prompt, but not continued to the certification stage*
c) *not applied GHS at all.*

We appreciate your input. It will shape the updated scheme (both in terms of what is addressed and how it's managed) and will contribute to its future success. It does not matter whether or not you have used the GHS.

This survey should take you only about 10-15 minutes to complete. All information will be treated as confidential. The data from each survey will reported at the aggregate level. No individual will be identifiable.

Your name: *(Please fill in)*	_____

THE *GHS* OPERATION

Q1. When did you attend the half-day GHS workshop? *(Please tick year)*

❑ 1997	❑ 1999	❑ 2001
❑ 1998	❑ 2000	❑ 2002

Q2. Do you currently have any of the GHS-related resources? *(Please tick as appropriate)*

RESOURCE	Yes	No	Don't know
The GHS **Designers Guide** (colour, spiral bound A4 booklet)	❑	❑	❑
The GHS **Homeowners Guide** (colour, spiral bound A4 booklet)	❑	❑	❑
The GHS **Assessment Worksheets** (A4 black and white sheets)	❑	❑	❑
The GHS **Certificate Request Form** (Single, black and white sheet)	❑	❑	❑
The GHS **Assessors Licence Agreement**	❑	❑	❑
GHS **flyers** (tri-folded A4)	❑	❑	❑
The **"*What is Sustainable Design?*"** supporting flyer (folded A3 glossy)	❑	❑	❑
The GHS background resources on 3.5'' **floppy disk**	❑	❑	❑

Q3. Have you used the Green Home Scheme for any of the following? *(Please tick as appropriate).*

ISSUE	Yes	No
As a formal auditing tool and award scheme	❑	❑
As a reference to improve the environmental performance of home design (without applying for a formal certificate)	❑	❑
As in informative document to introduce environmental principles into the design process	❑	❑
Other *(please explain below)*	❑	❑

What other uses have you used the Green Home Scheme for?

Q4. Have you used the GHS for formal certification purposes? *(Please tick appropriate box)*

❑ **YES** ☞ Go to Question 6

❑ **NO** ☞ Go to Question 5

Q5. Why have you NOT used the Green Home Scheme for certification purposes? *(Please specify).*

_____

_____

_____

_____

Q6. How important are the following issues in creating an eco-home? *(Please tick as appropriate)*

ISSUE	Not important	Important	Very important
Passive solar design techniques	❑	❑	❑
Household appliance energy efficiency	❑	❑	❑
Eco-building materials	❑	❑	❑
Storage of (kerbside) recyclables	❑	❑	❑
Water economy and efficiency	❑	❑	❑
Walking distance to public transport/amenities	❑	❑	❑
Composting on site	❑	❑	❑
Indoor air quality	❑	❑	❑
Toxicity of wood preservatives	❑	❑	❑
Safe storage of hazardous substances	❑	❑	❑
Designing for global warming threats (flooding, temperature extremes etc)	❑	❑	❑
Reducing construction-site material waste	❑	❑	❑

Q7. How easy is the GHS system to apply to actual house drawings/plans? *(Please tick box)*

Not easy	Easy	Very easy	I've never used it to apply to actual house plans
❑	❑	❑	❑

Q8. How easy is the insulation (Heat Loss calculation) to apply to actual house drawings/plans? *(Please tick appropriate box)*

Not easy	Easy	Very easy	I've never used it to apply to actual house/drawing plans
❑	❑	❑	❑
Go to question 9	Go to question 10	Go to question 10	Go to question 10

Q9. If you have ticked "Not easy" in Q8 above, can you identify why?
(Please tick appropriate box)

- ❑ Too long
- ❑ Too laborious to work out the elemental (i.e. floor, wall, window and ceiling) areas
- ❑ Too difficult to source the correct R (i.e. insulation) values for each material
- ❑ Other *(Please specify)*

Q10. Do you think that the GHS assessment gives an accurate picture of a 'green' home?
(Please tick as appropriate).

Not accurate	Accurate	Very accurate
❑	❑	❑
Got to Question 11	Go to Question 12	Go to Question 12

Q11. If you answered "Not accurate" to Q10 above, please explain. *(Please state reasons).*

Q12. What DON'T you think works well in the Green Home Scheme? *(Please state).*

Q13. Where have you seen the GHS advertised? *(Please tick as many as appropriate).*

- ❑ '*EcoLiving'* magazine
- ❑ BRANZ's '*BUILD'* magazine
- ❑ The '*Easy Guide to Eco-Building'* booklet
- ❑ EECA's '*Passive Solar Design for New Zealand Homes*' pamphlet
- ❑ At regional home shows and home display events
- ❑ At eco field-days and eco-events
- ❑ Regional and local papers
- ❑ Other *(please state)*

_____

_____

_____

Q14. How easy is it to access BRANZ support on the GHS? ***(Please tick appropriate box).***

Not easy	Easy	Very easy
❑	❑	❑

Q15. How would you describe BRANZ technical support for the GHS? ***(Please tick appropriate box)***

- ❑ I don't know how to get support from BRANZ
- ❑ BRANZ support was not very useful
- ❑ BRANZ support was useful
- ❑ BRANZ support was very useful
- ❑ Never used it

GENERAL QUESTIONS ON GREEN DESIGN

Q16. Which of these statements best indicates the views of new homeowners when building a new house? *(Please tick one box only)*

- ❑ Have not considered the environmental implications of their house at all.
- ❑ Are interested in green issues, but not interested in a *Green Home Scheme* certificate
- ❑ Are receptive to green issues once they have been explained in terms of 'resource use'
- ❑ Have a bad perception of green/eco-friendly design

Q17. What do you think are the main barriers to a new homeowner including eco-principles within the design of their new home? *(Please tick the two or three most important barriers)*

- ❑ Lack of publicity about and awareness of eco-design/living
- ❑ The extra time commitment required by designer/architect
- ❑ Perceived extra cost of incorporating eco-design attributes
- ❑ Lack of interest by the new homeowner in environmental issues in general
- ❑ Lack of support from the building industry
- ❑ Lack of support/direction from local government
- ❑ Lack of support/direction from central government
- ❑ Lack of understanding of the benefits of green homeownership. It is still seen as a fringe activity with little practical benefits
- ❑ Other *(Please specify)*

_____

_____

_____

_____

_____

Q18. What are your main sources of eco-design information? *(Please tick the most commonly used)*

- ❑ Specialists within the industry
- ❑ The Internet
- ❑ Product literature
- ❑ Building Biology and Ecology (BBE) literature
- ❑ Periodicals, such as '*EcoLiving'* magazine, '*Energy-Wise News'* etc
- ❑ Technical bulletins
- ❑ The library
- ❑ Books
- ❑ Other *(Please specify)*

Q19. How are you using the eco-design information mentioned in Q18? ***(Please tick appropriate box or boxes)***

- ❑ As a prompt for including green issues
- ❑ As promotional/advocacy material
- ❑ General design guidance
- ❑ Specific design guidance
- ❑ As an auditing tool/checklist
- ❑ Other *(Please specify)*

Q20. What specific eco-design assistance publications do you most commonly refer to? *(Please tick top three most commonly referred to)*

- ❑ Waitakere City Council's '*Sustainable Home Guidelines'*
- ❑ '*Passive Solar Design for New Zealand Homes'*
- ❑ EECA's '*Design for the Sun'*
- ❑ Building Biology and Ecology (BBE) literature and information.
- ❑ The NZIA comparative building element charts
- ❑ The '*Good Wood Guide'*
- ❑ The BRANZ '*Green Home Scheme – Designers Guide'*
- ❑ '*EcoLiving'* magazine
- ❑ '*Designing Comfortable Homes'*
- ❑ NZ Standards '*Code of Good Practice for Energy Efficiency of Houses'*
- ❑ Other *(Please specify)*

Q21. What do you think is currently lacking in eco-design information which is NZ-specific? *(Please specify)*

_____

_____

_____

Q22. Do you think the following eco-design tools/information would be useful for NZ? *(Please tick the three most useful)*

- ❑ A sustainable building sourcebook (i.e. a practical "how-to" guide), for use as a reference for builders/specifiers/designers/homeowners
- ❑ An educational tool for the public which has details of sustainable building practices
- ❑ Easy-to-use passive solar design tools
- ❑ Internet-based auditing or decision support tools
- ❑ Supportive standards/codes/guidelines
- ❑ Industry-run workshops held throughout the country on green design.
- ❑ Other *(Please pecify)*_____

Thank you for your time helping to influence the revamped version of the BRANZ *Green Home Scheme*. Any other comments on the schemes operation are most welcome (please write below).

Please mail this form back in the prepaid envelope.

Any general comments *(Please state below).*

APPENDIX C: FEEDBACK LETTER TO RESPONDENTS

{address}

Dear _____

RE: SUMMARY OF BRANZ *GREEN HOME SCHEME* SURVEY

Thanks very much for completing the *Green Home Scheme (GHS)* questionnaire, which I sent you in late February. The response rate was very good – at 68%. A special thanks to those who took some extra time to provide feedback on the longer answer questions – your insights into the various issues were very informative. Although not mentioned in the questionnaire, I'm sure that you would like a summary of the responses, so here is an overview.

Most of you seemed happy with the GHS both in terms of its assessment and operation – however, there was concern over the lack of advertising and publicity, which you thought hampers the schemes uptake. This concern was expressed in both the short and long answer questions, and is an issue which BRANZ will address as part of the GHS revamp. Overall, however, the GHS assessment procedure seems to reflect your wants/needs in an assessment tool.

In addition to the lack of publicity about eco-design/living, it was thought that the top barriers to a new homeowner including eco-principles within their new home design (Q16) were:

- the perceived extra cost of incorporating eco-attributes
- a general lack of interest by the homeowner in eco-issues.

Passive solar design techniques were considered to be the most important issue in creating an eco-home, followed by eco-building materials and water economy (Q6). Please refer to Figure 1 (over page) for a breakdown of each issue by its perceived importance.

The most popular sources of eco-design information were periodicals and books (Q18). The top three eco-design tools/information you think would be most useful (Q22) are:

- A sustainable building sourcebook and an easy to use passive solar design tool.
- An educational tool for the public, and
- Supportive standards/codes/guidelines

As to specific eco-design assistance publications most commonly used (Q20), respondents rated the *EcoLiving* magazine as number one, followed by Waitakere City's *Sustainable Home Guidelines* and

the Building Biology and Ecology (BBE) literature. I'm sure the authors of these publications would find this pleasing!

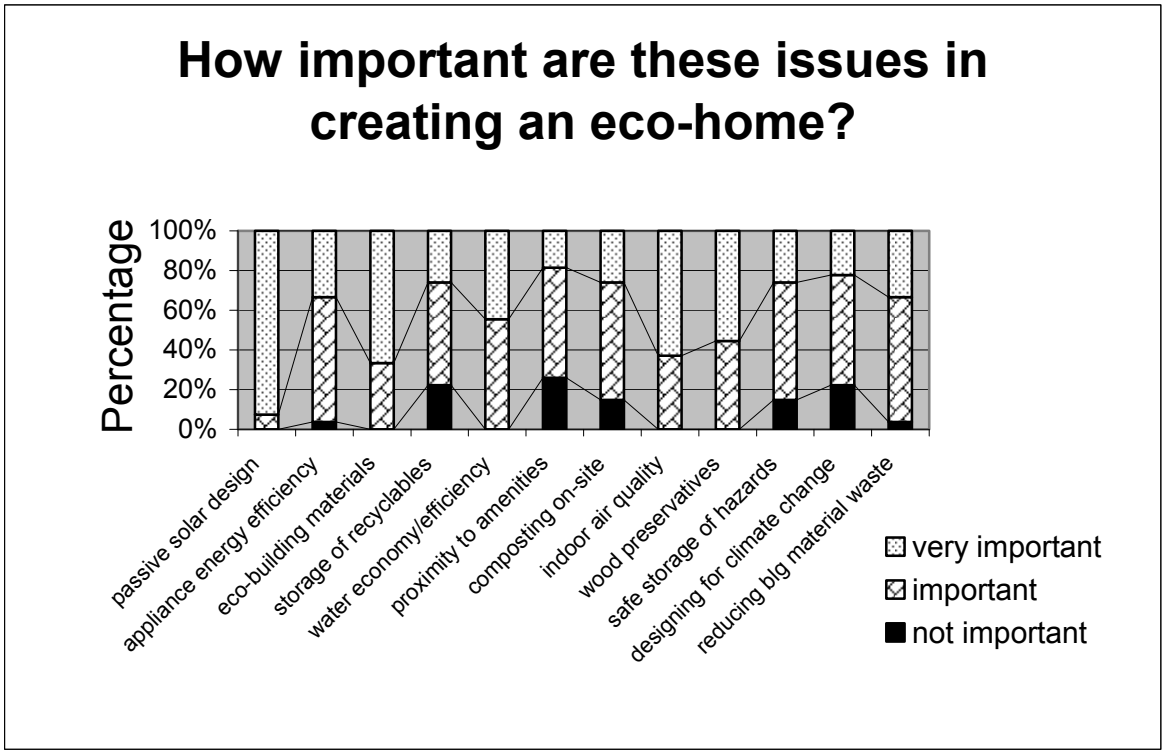

Figure 1: Survey Q6 on important issues in creating an eco-home

For those that are accredited assessors, please check that your details are correct periodically on the BRANZ web site (www.branz.co.nz/main.php click "*Information….*", then "*Resources for the industry*", and finally "*Greenhome Accredited Assessors*"). This letter will be followed by a '*Letter of Amendments*', which will detail the changes to the existing documents and associated promotion activities to watch out for as part of this updating and upgrading procedure.

If you would like further details on the survey, a full study report will be available for a small fee from BRANZ later on in the year. If there is a specific issue you would like to discuss about the GHS survey or the GHS operation, please contact me at dd 04 238 1367 or by email on RomanJaques@branz.co.nz.

Good luck with future assessments!

Regards

Roman Jaques
Building Environmental Scientist

PS: Here are some excellent new(ish) resources you may want to explore…For general **sustainable design** information: www.greenhouse.gov.au/yourhome/index.htm; for **water efficiency** information: www.savewater.com.au and check out the upcoming *Code of Good Practice for Energy Efficiency of Houses* from Standards New Zealand SNZ 4244 (in draft) which describes the methods and benefits for **improved insulation levels**.

APPENDIX D: AMENDMENTS TO GHS

The following 'Letter of Amendment' will be sent out to all the GHS Accredited Assessors, so that their working and assessment documents will be up to date. As well as this letter, a copy of the revised GHS Designers Guide and Assessment Worksheets will be provided, incorporating all the changes suggested within this study report.

Letter to Accredited Assessors

Dear _____

Since the introduction of the GHS in late 1997, there have been several developments in terms of guidance and tools available which impact on technical aspects of the scheme. In addition, the recent survey showed that there was some fine-tuning necessary to the scheme. As a result, there are several amendments which affect both the GHS *Designers Guide* and the GHS *Assessment Worksheets*.

Changes for the GHS Assessment Worksheets:
Please discard copy of your old assessment worksheets and replace with that attached. This will be your new 'pro-forma' to photocopy and complete for each assessment. The pdf version is also available on the enclosed floppy disk.

Changes for the GHS Designers Guide:
The changes to the Designers Guide are listed in the Table below. A hardcopy has been included and the pdf version is available on the enclosed floppy disk.

Page number on *Designers Guide*	**ORIGINAL TEXT**	**NEW TEXT**

Please note that these changes have no significant bearing on the level or degree of difficulty in obtaining the various grades ('*fair*', '*good*', '*very good*' or '*excellent*') of Environmental Performance rating. Thus, there will be no discrimination against the new users.

Thanks for your assistance. Please let me know if you would like to discuss any of these changes further.

Regards

Roman Jaques
Building Environmental Scientist