Deloitte.

Housing New Zealand Corporation

Economic Analysis of Housing Interventions (Benefits)
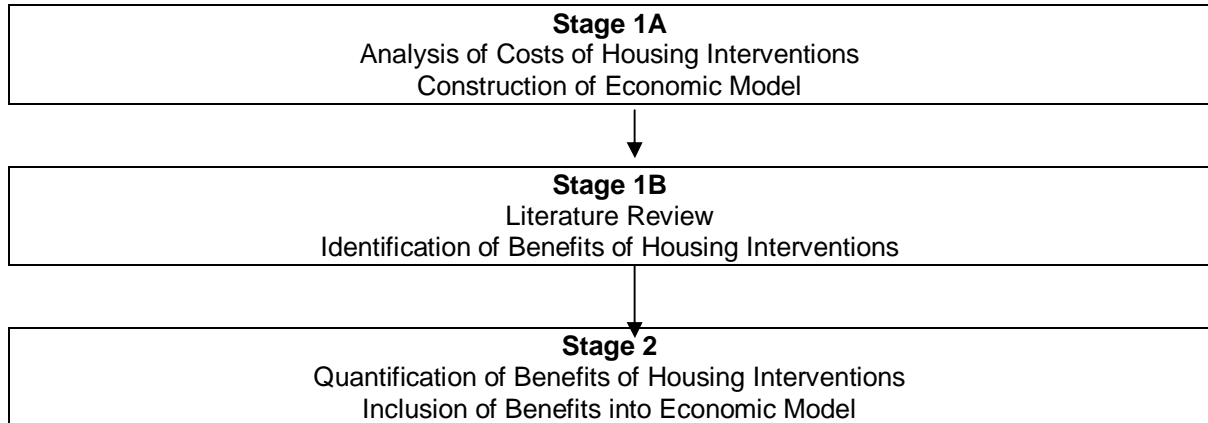
November 2007

Deloitte.

Table of Contents

1.   Executive Summary

Housing New Zealand Corporation ("Housing New Zealand") has put in place a three stage analysis of its current housing programmes to evaluate whether the assistance provided through these interventions is flowing through to those with the highest need and if not, whether any changes could be made to improve this assistance.

Stage 1A
Analysis of Costs of Housing Interventions
Construction of Economic Model

Stage 1B
Literature Review
Identification of Benefits of Housing Interventions

Stage 2
Quantification of Benefits of Housing Interventions
Inclusion of Benefits into Economic Model

This paper provides analysis of the benefits of housing intervention as part of Stage 2 of this programme, incorporating elements of Phase 1 where appropriate.

Approach

The purpose of a benefits analysis is to understand the average and marginal benefit for each intervention with the aim of showing which intervention provides the greatest benefit in the context of a constrained Housing New Zealand budget. The results of the quantifiable benefit analysis need to be taken in context with the many unquantifiable benefits which arise from providing housing assistance.

In an environment of unconstrained resources the theoretical framework for evaluating the effectiveness of housing interventions is relatively clear. An optimal state is reached when:

- the net marginal benefits of each intervention are equal; and

- the net marginal benefit of additional intervention is nil.

In other words a point has been reached at which no additional investment in any of the set of interventions identified will yield any additional benefit.

While the principles set out above hold, in either a purely commercial/private sector or a public/mixed environment, additional complexities arise with the theoretical model in a public/social context. In particular:

- benefits are more difficult to link to individual interventions;

- benefits are more complex to quantify; and

- disaggregating benefits between those of a public (benefit to society) and those of a private (benefit to the individual) nature requires significant judgement and therefore will lack precision.

In this paper we:

(i)   set out the specific interventions to be evaluated;

(ii)   develop the quantitative models necessary to evaluate the costs and benefits of the differing interventions;

(iii)   where possible, incorporate the findings from NZIER in relation to the cost of these interventions;

(iv)   identify the benefits attributable to each intervention;

(v)   where benefits are quantifiable and sufficient data is available, develop mechanisms for quantifying benefits;

(vi)   where benefits are quantifiable but insufficient data is available to undertake any quantification we identify the research/analysis workstreams necessary to close these data gaps; and

(vii)   where benefits are not quantifiable we propose that further work be undertaken to develop a mechanism for "valuing" or "rating" these in non financial terms.

Note that no benefits are directly ascribed to Income Related Rent ("IRR") or Accommodation Support ("AS") since these are effectively transfer payments within the Government's welfare system, however it is not possible to identify the benefits of each of the above interventions excluding these affordability measures as they are inextricably linked.

Interventions

For the purposes of analysing the benefits of housing interventions for this report, the interventions are defined as follows:

- State housing investment, in combination with Income Related Rent;

- Investment in non-government social housing provision through Housing Innovation Fund/Local Government Fund ("HIF"/"LGF"), in combination with the Accommodation Supplement; and

- Facilitation of first home ownership through Mortgage Insurance and Shared Equity assistance, in combination with the Accommodation Supplement.

Each of these interventions is directly supported by the *NZ Housing Strategy* which sets out seven "Areas of Action". The full list of initiatives for each are set out in Appendix B. This report makes reference to a number of the initiatives as being particularly important in delivering the benefits highlighted here. These include:

- increasing the number of state houses;

- modernising existing stock and energy efficiency retrofitting;

- continuing to implement the Health Housing and Community Renewal programmes;

- supporting the expansion of social housing through HIF;

- expanding the Mortgage Insurance Scheme; and

- exploring a home equity scheme.

Benefits

For each intervention a range of quantifiable and non-quantifiable benefits can be identified. An overview of these benefits is set out below:

Table 1 Overview of Benefits

Intervention	Benefits to Tenants	Potential Benefit to Society
Investment in State Housing/IRR	- Provision of shelter to those in need. - Healthier living environment. - Helps increase income, cheaper rent. - Facilitated community involvement/attachment. - Greater ability to participate in education and training, and higher levels of achievement. - Improved safety and security – less likely to be a victim of crime. - Improved amenity levels. "Good landlord", including security of tenure, property maintenance.	- Enhanced family well-being. - Healthier population. - Greater education participation (lower truancy and drop-out levels) and achievement. - Lower levels of crime. - Greater labour market participation, reduced reliance on benefits. - Reduced numbers of people "detached" from society.
Investment in non-government social housing provision through HIF/LGF/AS	- Assuming loans are tied to both quantity and quality criteria for supply of social housing then as above, but in addition, **AS:** - Allows people to retain control over where they live – closer to employment and education/training opportunities. - Allows a greater choice in the type and location of rental accommodation. - Helps increase income. - Allows homeowners with mortgages to continue to live in their own home.	- As above, but in addition, **HIF:** - Strengthens local authority commitment to remain in social housing. - Funded projects provide tailored local housing provision to specific client groups. - Provides greater flexibility to provide housing closer to employment and training opportunities.
Facilitation of first home ownership	- Assisted into home ownership, which provides: - Housing as an investment/form of compulsory savings ; - Greater security of tenure; - Feeling of wellbeing; - Greater choice of location – closer to employment and education/training opportunities; and - Ability to carry out "DIY" improvements to increase house quality in terms of healthy environment of energy efficiency.	- Enhances family stability and improves the connections families have with their communities. - Provides a buffer against poverty. - Encourages sustainable labour market participation. - Fewer hospital admissions. - Contributes to improving the overall quality of housing.

This analysis focuses on the potential ***benefit to society***. The linkage between outcomes and benefits (both quantitative and qualitative) is shown in the diagram below for illustrative purposes:
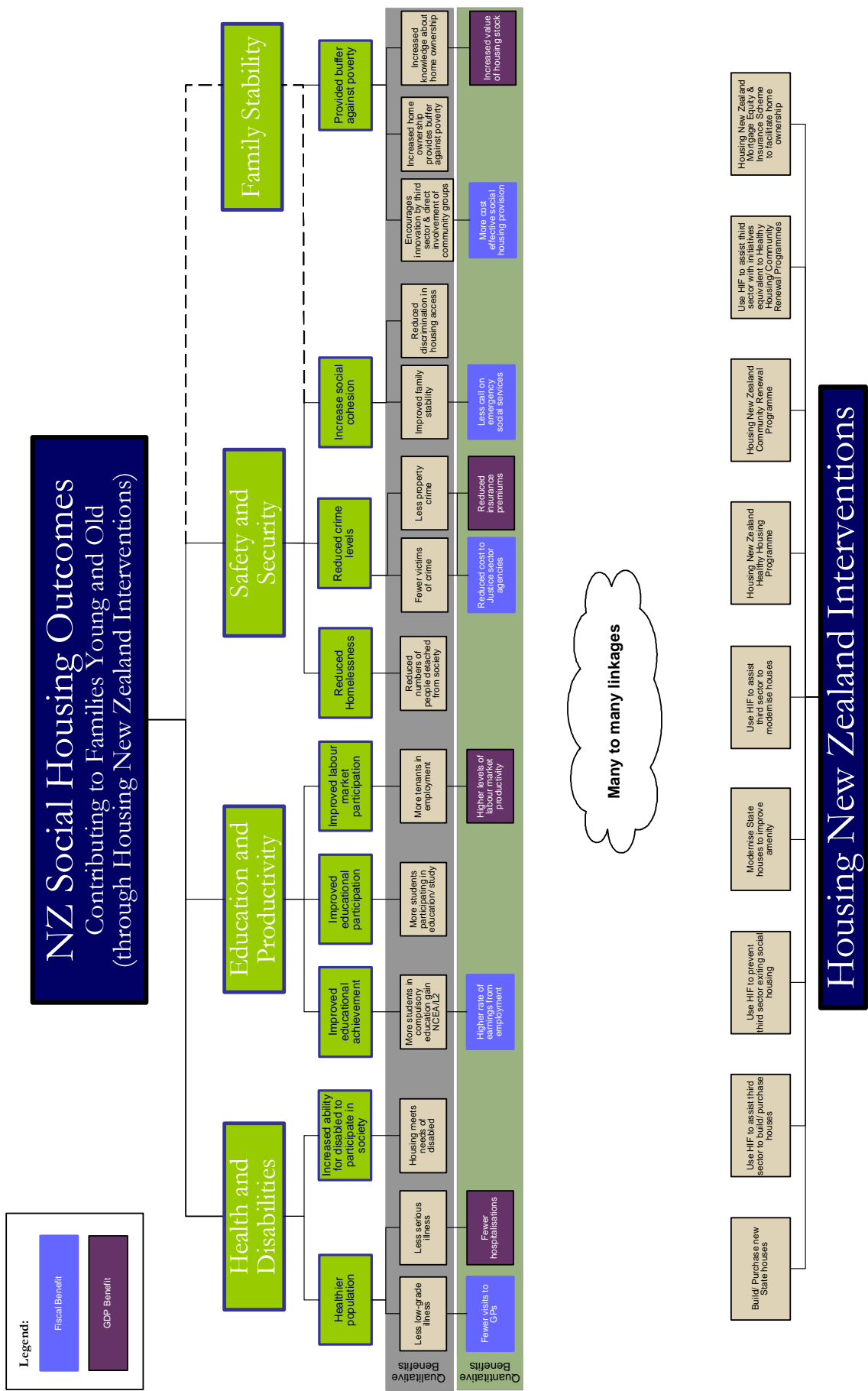
NZ Social Housing Outcomes
Contributing to Families Young and Old
(through Housing New Zealand Interventions)

Legend:
- Fiscal Benefit
- GDP Benefit

Health and Disabilities
- Healthier population
  - Less low-grade illness — Fewer visits to GPs
  - Less serious illness — Fewer hospitalisations
- Increased ability for disabled to participate in society
  - Housing meets needs of disabled

Education and Productivity
- Improved educational achievement
  - More students in compulsory education gain NCEA/L2 — Higher rate of earnings from employment
- Improved educational participation
  - More students participating in education/ study
- Improved labour market participation
  - More tenants in employment — Higher levels of labour market productivity

Safety and Security
- Reduced Homelessness
  - Reduced numbers of people detached from society
- Reduced crime levels
  - Fewer victims of crime — Reduced cost to Justice sector agencies
  - Less property crime — Reduced insurance premiums
- Increase social cohesion
  - Improved family stability — Less call on emergency social services
  - Reduced discrimination in housing access
  - Encourages innovation by third sector & direct involvement of community groups — More cost effective social housing provision

Family Stability
- Provided buffer against poverty
  - Increased home ownership provides buffer against poverty
  - Increased knowledge about home ownership — Increased value of housing stock

Qualitative Benefits
Quantitative Benefits

Many to many linkages

Housing New Zealand Interventions

- Build/ Purchase new State houses
- Use HIF to assist third sector to build/ purchase houses
- Use HIF to prevent third sector exiting social housing
- Modernise State houses to improve amenity
- Use HIF to assist third sector to modernise houses
- Housing New Zealand Healthy Housing Programme
- Housing New Zealand Community Renewal Programme
- Use HIF to assist third sector with initiatives equivalent to Healthy Housing/ Community Renewal Programmes
- Housing New Zealand Mortgage Equity & Insurance Scheme to facilitate home ownership

Figure 1 *NZ Social Housing Outcomes*

We have reviewed the research carried out by or on behalf of Housing New Zealand and the Centre for Housing Research Aotearoa New Zealand ("CHRANZ") and also by/for the Ministry of Social development (MSD), the Ministry of Health and the NZ Council for Educational Research (NZCER) and have identified three key areas where indicative quantitative analysis is possible, using the data currently available. These three areas can be classed into two categories as follows:

Category 1: research data available to support the relationship between housing interventions and benefits but the analysis is incomplete;

- **Health** outcomes as measured by levels of hospitalisation and the costs to the taxpayer of hospitalisations. Benefits in terms of wider health outcomes as measured by, for example, GP visits, are not able to be measured as the research has not been carried out.

Category 2: research available to support the relationship between housing interventions and benefits, but the nature of the research does not allow for quantification of benefits;

- Improved rates of compulsory **Education** participation, as measured by higher levels of educational attainment (highest school level qualification), with the benefit to society being measured as fiscal benefit to the Government from higher average wages which are associated with higher educational attainment.

- Reductions in **Crime**, as measured by levels of crimes reported and/or criminal convictions and the costs to the taxpayer of police time, costs to the Courts, and costs to the Department of Corrections for prisoners held on remand or incarcerated following conviction.

Note that this limited quantitative benefit analysis has focused only on the fiscal benefits to the Government/taxpayer and therefore excludes wide economic benefits to society. In addition, other outcomes, including labour market outcomes and the broader benefits in respect of post-compulsory education, public health, and the reduced cost to the victims of crime are areas which could possibly be measured if research were to be undertaken and a detailed input-output economic model constructed[1], but at the present time are only able to be discussed in a qualitative sense.

Wider benefits again such as benefits relating to improved social cohesion, family stability and reduced levels of discrimination in housing access are not able to be measured in any meaningful sense. In many respects these wider benefits are just as important if not more so than the narrow set of benefits which we have been able to quantify.

Even with the three identified areas for quantitative analysis, there remains significant difficulty with the availability of data to accurately assess their quantitative value. Because of this, a cost constrained cost-benefit analysis is unable to be accurately completed. Therefore this report only quantifies those benefits where empirical data is currently available, and makes recommendations as to further analysis which should be carried out by Housing New Zealand and/or other related agencies, to allow a more accurate and complete benefit analysis to be built over time.

There are significant gaps in the research needed to support an accurate quantification of the health. However, education and crime reduction benefits from appropriately targeted housing intervention the research to date suggests that these real, but as yet unquantified benefits, could be significant.

---

[1] The construction of such a model is outside the scope of this project. Such a model would represent a very ambitious undertaking and possibly take several years to complete.

Theoretical Framework

The theoretical framework proposed for evaluating the costs and benefits of different interventions is as follows:

Table 2 Theoretical Framework

Intervention	Total NPV		
	Net Cost (per NZIER)	Quantifiable Benefits	Non Quantifiable Benefits
Investment in State Housing/IRR	Investment, net of rent contribution and capital appreciation.	Base health, education and crime.	Base qualitative benefits.
Investment in third sector social housing provision through HIF/LGF/AS	Net cost of loan /advance plus capitalised AS.	Base health, education and crime plus marginal additional benefits derived through non-government provision.	Base qualitative benefits plus marginal benefits associated with non-government provision.
Facilitation of first home ownership	Net cost plus capitalised AS.	Base health, education and crime plus marginal additional benefits associated with first home ownership.	Base qualitative benefits plus marginal benefits associated with first home ownership.

The main issue with the above framework is the difficulty in accurately assessing the quantitative value of benefits both in an absolute (i.e. across all interventions) and marginal (between interventions) sense.

Further, there was significant debate amongst the wider working group we met with as part of this study as to whether it is appropriate to consider the facilitation of first home ownership within the same framework as interventions involving the direct provision of rental housing. It is arguable that both the costs and benefits associated with the facilitation of first home ownership are materially different to those associated with direct provision of appropriate rental housing.

Nonetheless, at the current time it is possible to conclude that the highest level of benefit is likely to be generated by the addition of a new housing unit to the existing stock of social housing, assuming that this new housing unit provides a good standard of accommodation (equivalent or higher, for example, to the standard of house provided by Housing New Zealand following investment in a property under the Healthy Housing Programme).

This is because a new additional house provides the opportunity to reduce the very long current waiting list for State houses (i.e. meets a basic level of need for a family with a high priority rating on the waiting list) by providing a housing unit of a good "healthy" standard.

Similarly, where there is the possibility of withdrawal of social housing provision by non-government providers, investment by Housing New Zealand through HIF which prevents this withdrawal and at the same time allows for investment in modernisation may also provide considerable benefits given the opportunity cost of losing this housing provision.

The benefit of investing in an existing property will be lower as such investment will only meet the needs of an existing tenant (or future "equivalent" replacement tenants). However, a higher level of net benefit (benefit less cost) may in fact be achieved by investing in an existing house (e.g. Healthy Housing programme, Community Renewal programme, Housing Modernisation programme), depending on the relative cost of this investment compared against the cost of acquiring a new house.

Given the huge variability in the modernisation costs for existing housing units, this cost-benefit analysis can only be carried out on a case by case basis.

The framework above requires significant further refinement before it is possible to assess accurately:

- the implications of capital constraints;

- the implications of targeting versus not targeting; and

- the "tipping points" at which a transition between one form of intervention to another becomes appropriate.

However, we believe that it is possible to make certain propositions, as follows:

- as long as there is significant unmet demand from households who are unable to access appropriate accommodation, other than by way of direct provision then this represents the most cost effective intervention, whether by Housing New Zealand or non-government, provided the intervention is targeted at those in greatest need;

- the "tipping" point between direct provision and income support is the point at which income support is sufficient to enable a household to access an equivalent level of accommodation from the private sector, where equivalent level of accommodation includes not only the physical characteristics of the property but also other factors such as an appropriate landlord/tenant relationship; and

- the tipping point between income support and first home ownership is the point at which first home ownership is achievable without compromising the financial position of the household to the point at which the financial and other stresses overwhelm the benefits associated with ownership.

Limitations on Proposed Framework

Even with enhancements to available research and data to better inform the proposed framework there will remain significant limitations with this approach. In particular the model of itself will not address the following:

- the implications for the analysis of material increases in, for example, direct investment in social housing in terms of the impact of factors such as asset prices, overall supply and market rents; and

- the relationship between interventions and the efficiency/effectiveness of current capital allocation, i.e. a preferred intervention model could be based on the shifting of households over time from direct provision, to income support and ultimately to home ownership – the proposed model does not evaluate this form of dynamic intervention.

Further Data Collection and Research Required

Further detailed research into the linkages between housing interventions and the main benefits discussed in this report is essential if Housing New Zealand wishes to better understand the effectiveness of housing interventions in terms of quantifiable benefits. Following completion of this research, HNZ will be in a better position to better understand where the next marginal dollar of investment would most effectively be applied.

A key early step is for Housing New Zealand and related agencies (Department of Building and Housing, in particular) to reach agreement as to an agreed standard for "good quality" housing in New Zealand. This will enable a benchmark to be set so that research can be undertaken into the benefits of providing housing which meets this standard. Without such a benchmark, any research undertaken will be ad hoc and inconsistent in its conclusions.

A collection of further data in the following areas would also be helpful in analysing the effectiveness of the interventions carried out by Housing New Zealand:

- Current levels of homelessness in New Zealand (including those living a transient life, moving frequently).

- A complete picture of waiting lists across the non-government as well as for state housing, including measures of need.

- Levels of over-crowding across New Zealand households.

- Numbers of households living in unhealthy housing other than through over-crowding.

- Numbers of "vulnerable" households living in unsuitable accommodation, including those with special needs, illness and injury.

If an accurate view is to be developed as to the absolute benefits of adequate housing, and the difference in the level of benefit associated with different interventions, then further research into the relationship between housing and the proposed quantitative and qualitative benefits, by intervention, is necessary. The current research is limited, and does not distinguish between the type of intervention. Without this analysis the benefits of adequate housing cannot be distinguished between intervention type and, therefore, any cost benefit analysis is reduced to an assessment of relative net cost.

Finally, we suggest that it would be highly beneficial to put in place standard guidelines for implementation of a benefit realisation framework at the outset of the implementation of any new or enhanced initiative. This requires the following:

(i)   *At the outset*, research and agree baselines, e.g. current levels of hospitalisations for social housing tenants in a particular setting;

(ii)   Set targets based on those baselines for specific initiatives;

(iii)   Agree Key Performance Indicators (KPIs) that are meaningful and measurable – these should focus on the targets but also measure other factors likely to impact on the targets;

(iv)   Establish a KPI monitoring processes and governance structure, and

(v)   Foster accountability and on-going ownership around benefit realisation.

2.   Introduction

Housing New Zealand Corporation ("Housing New Zealand") is the key provider for the Crown in terms of the Crown meeting its social objectives regarding housing. Housing New Zealand provides policy advice to the Minister of Housing and also administers key housing assistance to those households within New Zealand who are in need.

The housing assistance that Housing New Zealand provides to the New Zealand population is made up of four key areas:

- State Housing provision, in which Housing New Zealand currently provides over 66,500 houses.

- Community housing programmes, including the Housing Innovation Fund ("HIF") and the Local Government Fund ("LGF"). These funds provide cheap loans to local governments and community organisations with the purpose of increasing or maintaining supply of social housing through the private rental sector (the non-government) for people in need.

- Affordability assistance through Income Related Rent ("IRR") and Accommodation Supplement ("AS"). IRR is only available to tenants of state houses (91% of these households are eligible) and AS is provided to anyone who is eligible and not a tenant of a state house (administered through Work & Income NZ).

- Assisting people in purchasing their own home. This is primarily through the Mortgage Insurance Scheme, with a shared equity scheme also planned.

The purpose of the research and analysis set out in this report is to identify an indicative economic framework for considering the optimal mix of housing assistance.

The high-level policy questions that the research is to inform are:

- What is the appropriate way to consider and decide on achieving housing interventions so that the benefit of housing assistance is maximised?

- How might Housing New Zealand make trade-offs in the various levels of housing assistance targeted to specified groups with unmet housing needs?

- How can Housing New Zealand quantify the average and marginal value and cost of each of the selected housing interventions?

- The specific policy question this study attempts to answer is: "What are the average and marginal net benefits and costs for selected interventions?" The approach taken to answering this question is to provide a framework for cost benefit analyses of the interventions in such a way as to enhance Housing New Zealand's understanding of how the interventions influence social wellbeing. The interventions are:
    - provision of social housing (State Housing and Housing Innovation Fund);
    - affordability assistance (Income Related Rent and Accommodation Supplement); and
    - home ownership (Mortgage Insurance and Shared Equity Schemes).

In order to answer the research questions the study was required to:

(i)   identify direct and indirect marginal and average benefits that accrue as a result of different interventions for different household types, Housing New Zealand, and the Government;

(ii)   develop protocols for quantifying benefits along with clear identification of the environment the protocols can be used in;

(iii)   integrate quantified benefits and costs in the economic framework into a cost benefit analysis, and include an indication of how robust the methodology is for identifying each of the benefits;

(iv)   develop protocols for assessing benefits that cannot be quantified; and

(v)   provide supporting documentation for benefits that can be quantified.

This report is structured as follows:

- Government Policy Objectives
- Target Groups for Housing
- Economic Analysis of Housing Programmes
- Housing Interventions and Initiatives
- Benefits Analysis Approach
- Benefit Categories and Cost Benefit Analysis
- Quantitative Benefits
- Qualitative Benefits
- Conclusions and Recommendations

3. Government Policy Objectives

Investment in social housing though Housing New Zealand makes an important contribution to *Families – Young and Old[2]*, one of the Government's three strategic policy themes for the next decade. This policy theme is led by the Ministry of Social Development and focuses on the important contribution social policy makes to building a successful New Zealand. It provides the framework for Ministers to lead transformative social policy by:

- identifying and addressing the underlying causes of social dysfunction;

- investing early in the life of the problem and of the person;

- tailoring responses to specific contexts and needs, provided through integrated service models;

- tilting the balance from remedial actions to preventative actions;

- supporting self-sufficiency and resilience for individuals, families, whänau and communities; and

- adopting a life course approach that focuses on key transition points and points of vulnerability in the lives of individual New Zealanders.

The theme recognises the link between social policy and economic development and the important contribution that social policy makes to the success of New Zealand. It involves the whole of the social sector and the agencies within it that are collectively responsible for the key components of transformative social policy. It also involves working with all those who contribute to the success of New Zealand, such as local government, Maori and other community organisations.

Within the cabinet paper on the policy it states that:

> "Adequate shelter is one of the most basic human rights to which we aspire. Affordable housing is important because it allows low and medium income families to buy other necessities after paying their housing costs. Home ownership is important as it leads to greater family stability and improves the connections families have with their communities and continuity of educational opportunities. It provides long term security and provides a major buffer against poverty. Families can also benefit from housing as an investment and a form of compulsory savings. Better quality housing enhances family well-being and leads to improved health outcomes."

---

[2] FAMILIES YOUNG AND OLD – TRANSFORMATIVE SOCIAL POLICY Cabinet paper. Refer http://www.msd.govt.nz/documents/work-areas/csre/families-young-old-cabinet-paper.doc

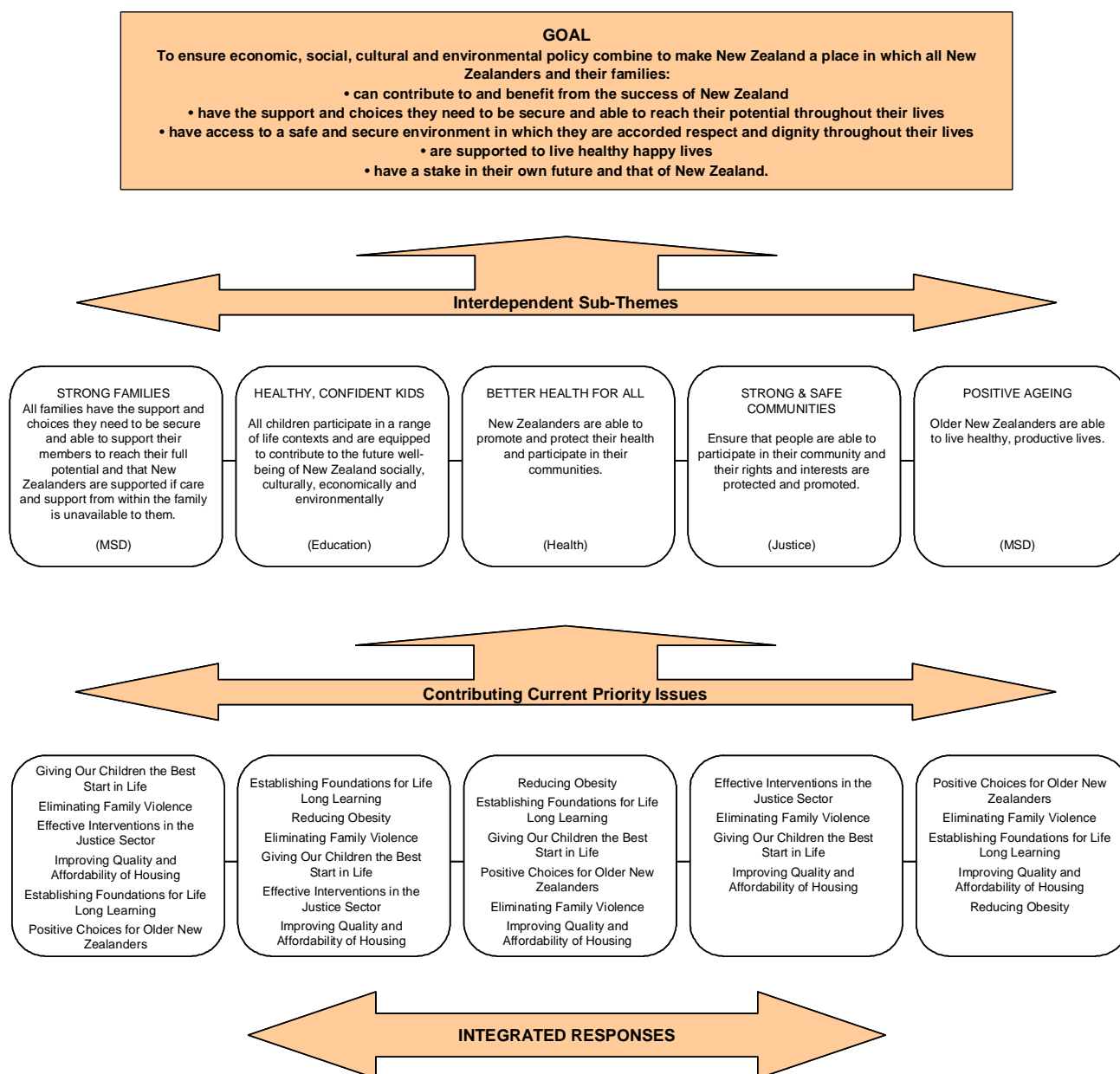The framework for Families – Young and Old is depicted in the diagram below:

GOAL
To ensure economic, social, cultural and environmental policy combine to make New Zealand a place in which all New Zealanders and their families:
• can contribute to and benefit from the success of New Zealand
• have the support and choices they need to be secure and able to reach their potential throughout their lives
• have access to a safe and secure environment in which they are accorded respect and dignity throughout their lives
• are supported to live healthy happy lives
• have a stake in their own future and that of New Zealand.

Interdependent Sub-Themes

STRONG FAMILIES
All families have the support and choices they need to be secure and able to support their members to reach their full potential and that New Zealanders are supported if care and support from within the family is unavailable to them.
(MSD)

HEALTHY, CONFIDENT KIDS
All children participate in a range of life contexts and are equipped to contribute to the future well-being of New Zealand socially, culturally, economically and environmentally
(Education)

BETTER HEALTH FOR ALL
New Zealanders are able to promote and protect their health and participate in their communities.
(Health)

STRONG & SAFE COMMUNITIES
Ensure that people are able to participate in their community and their rights and interests are protected and promoted.
(Justice)

POSITIVE AGEING
Older New Zealanders are able to live healthy, productive lives.
(MSD)

Contributing Current Priority Issues

Giving Our Children the Best Start in Life
Eliminating Family Violence
Effective Interventions in the Justice Sector
Improving Quality and Affordability of Housing
Establishing Foundations for Life Long Learning
Positive Choices for Older New Zealanders

Establishing Foundations for Life Long Learning
Reducing Obesity
Eliminating Family Violence
Giving Our Children the Best Start in Life
Effective Interventions in the Justice Sector
Improving Quality and Affordability of Housing

Reducing Obesity
Establishing Foundations for Life Long Learning
Giving Our Children the Best Start in Life
Positive Choices for Older New Zealanders
Eliminating Family Violence
Improving Quality and Affordability of Housing

Effective Interventions in the Justice Sector
Eliminating Family Violence
Giving Our Children the Best Start in Life
Improving Quality and Affordability of Housing

Positive Choices for Older New Zealanders
Eliminating Family Violence
Establishing Foundations for Life Long Learning
Improving Quality and Affordability of Housing
Reducing Obesity

INTEGRATED RESPONSES

Figure 2 *Families – Young and Old framework*

It can be seen that "Improving quality and affordability of housing" is a contributing current priority issue across all themes. Housing New Zealand in conjunction with the Department of Building and Housing is specifically tasked to focus efforts to "ensure a sufficient and responsive supply of affordable housing and a steady and significant improvement in housing quality".

The following proposed actions are outlined in the cabinet paper:

- Using new approaches to encourage home ownership.

- Increasing the supply of affordable housing where excessive housing costs are creating hardship for families and individuals and preventing them from attaining home ownership e.g. developing integrated communities like Hobsonville or brown-fields developments within the existing Housing New Zealand Corporation portfolio, and large non-government, not for profit, housing providers.

- Improving the quality of new and existing housing (e.g. improving quality through the Building Code Review and up-scaling the social housing modernisation programme).

- Improving housing and housing related outcomes in the most deprived areas (addressing urban and rural areas with concentrations of families with high and complex needs by investing in the Healthy Housing, Community Renewal and Rural Housing Programmes using a multi-agency approach).

This gives the context for the interventions Housing New Zealand implements and the targets for these interventions.

4. Target Groups for Housing

There are four main groups who the Government is seeking to assist with their involvement in housing.

Target Group	Description
Low income	High reliance on benefits
Special needs	Elderly People with disabilities (physical, sensory and mental) Large family groups
At risk	People who have been in dysfunctional relationships People recovering from drug or alcohol abuse Refugees and recent migrants Others who have difficulty coping with society
First home buyers	Young people with good incomes but no deposit People who previously owned property but can no longer afford a deposit following a relationship breakdown

Source: NZIER

Low income, special needs and at risk people have housing needs which are less likely to be met by the private rental market and so the Government is seeking to assist these groups. First home buyers are assisted because of the Government's desire to increase home ownership in New Zealand and the social and individual benefits that accrue from home ownership. These different groups have differing needs and so the interventions by Housing New Zealand need to respect this and try and ensure that these differing needs are met.

5.   Economic Analysis of Housing Programmes

In order to address the priority issue identified in the Cabinet paper of improving quality and affordability of housing an assessment of the current assistance provided and its effectiveness is essential. Housing New Zealand has put in place a three stage analysis of the current housing programmes to evaluate whether the assistance provided is flowing through to those with the highest need and if not, whether any changes could be made to improve the assistance.

Analysis of Housing Programme

| **Stage 1A** |
| Analysis of Costs of Housing Interventions |
| Construction of Economic Model |

↓

| **Stage 1B** |
| Literature Review |
| Identification of Benefits of Housing Interventions |

↓

| **Stage 2** |
| Quantification of Benefits of Housing Interventions |
| Inclusion of Benefits into Economic Model |
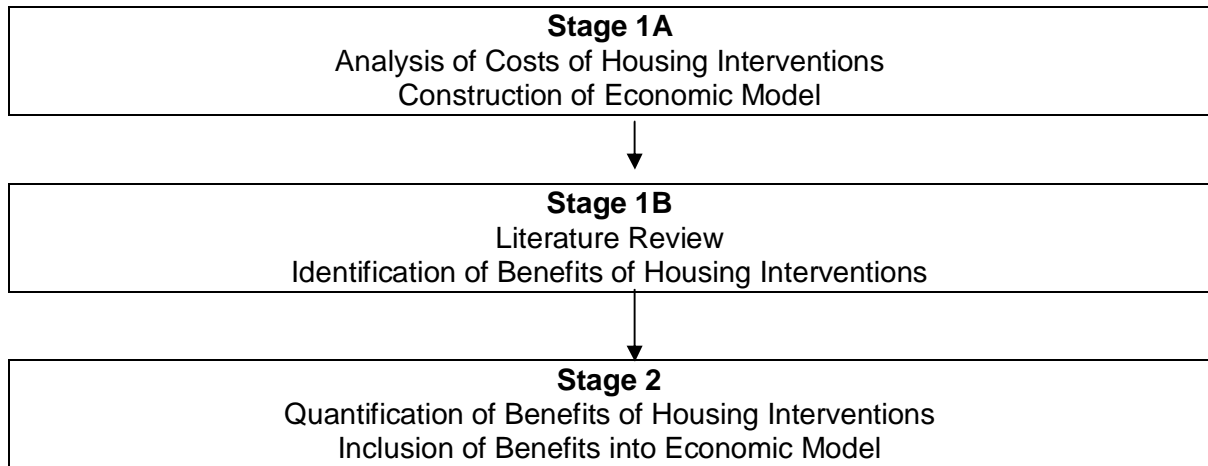
Source: Housing New Zealand and NZIER

This paper provides an analysis of the benefits of housing interventions as part of Stage 2 of this programme, incorporating elements of Phase 1 where appropriate.

Economic Framework

The primary objective of this study is to establish an economic framework to assist Housing New Zealand in making choices between housing investment strategies and in terms of the absolute level of investment in housing strategies. For the purposes of this study an "economic framework" is described as:

> "a process or tool that allows resource allocation decisions to be made"

In this section we:

(i)   provide an overview of key themes that influence the design of any "framework" in this context;

(ii)   outline the key features of the Treasury Cost Benefit Analysis Primer relevant to this study; and

(iii)   discuss key features of the NZIER study and findings, relevant to the design of our proposed framework.

Report Themes

Adequacy of Research/Information

This analysis is being undertaken in an environment where little relevant research has been undertaken in a New Zealand context to inform many of the key assumptions required to populate a fully functional cost benefit analysis. Therefore, while the study proposes a theoretical model – it also identifies significant limitations with this in the current environment and proposes practical steps for undertaking modifications to the model as better quality information becomes available.

Housing Market

The New Zealand housing market is New Zealand's largest market (by value), with approximately $600 billion[3] of capital invested, hundreds of thousands of market participants and tens of thousands of transactions annually. Information quality is high.

Given the above, it is reasonable to assume that market information is a reliable indicator of the costs and benefits associated with access to housing and consumer preferences.

Categorisation of Initiatives

As NZIER have identified, Government's initiatives fall broadly into two broad categories:

Categories	Policy Objective
Those whose needs are not adequately met by the private rental market (low income, special needs and at risk)	Address a (perceived) market failure whereby certain groups of society need access to social housing.
First Home buyers	Government's desire to increase home ownership rates.

From an analytic perspective different models are required to evaluate the net benefits of the different policies.

Treasury Cost Benefit Analysis Primer

The NZ Treasury's "Cost Benefit Analysis Primer" (V.1.12, December 2005) provides guidance as to how proposals for the use of economic resources should be considered by decision makers and will be assessed by the Treasury. It is required to be used when preparing budget initiative proposals and preparing business cases.

The Primer recognises that economic resource scarcity means that a decision to proceed with one proposal may preclude proceeding with others, and that Cost-Benefit Analysis ("CBA") is a useful assessment tool to quantitatively rank alternative proposals, including against the status quo.

It also recognises that although CBA can be applied to most proposals, due to its quantitative nature it has some limitations that mean it is not suitable for full and complete assessment of every proposal – for example it is often not possible to assign a monetary value to all costs and benefits.

---

[3] RBNZ: http://www.rbnz.govt.nz/keygraphs/Fig4.html

The purpose of a CBA is to:

- identify all significant benefits and costs, together with a risk assessment of cost sensitivities and benefit realisation;

- assign monetary values to benefits as well as costs, where possible and discount benefits and costs to present values; and

- consider the effect of any intangible costs and benefits that can not be reliably assigned monetary values.

Treasury's expectation is that the CBA will be undertaken from a national perspective rather than a governmental or departmental perspective wherever possible (a so-called economic CBA). This is because an economic CBA seeks to capture all benefits and costs regardless of to whom they accrue. Economic CBAs differ from financial CBAs which are valid only for proposals which are specific to a particular agency and have no or minimal effects on wider society or economy. CBAs are also quite different from fiscal costings which are typically included in Cabinet papers. Consequently an economic CBA does NOT cover:

- Accounting costs/benefits;

- Depreciation;

- Capital charge;

- Interest and financing costs;

- Taxes; and

- Transfer payments (unless these result in an overall change to societal welfare, rather than simply redistribution of wealth).

The Primer proposes a period of analysis of up to a suggested maximum of 20 years, with the actual period selected as appropriate to the underlying economic life of the proposal or assets, with a 10% discount rate applied to real values (that is, costs and benefits valued in today's dollar terms, not escalated to forecast future nominal values), unless there is an alternative agreed "sector" discount rate (for example, the weighted average cost of capital to a particular investment sector).

An economic benefit is any gain in the welfare of society and may include:

- Monetary benefits – such as operating cost reductions;

- Non-monetary benefits which can be quantified in non-monetary terms and may also be able to be translated into economic terms – such as reduced traffic accidents; and

- Non-monetary benefits which are not able to be quantified – i.e. qualitative benefits such as improved knowledge – and wider outcomes such as improved public health status.

Economic costs can be categorised similarly, from the opposite viewpoint. In both cases, it is important to focus only on material costs and benefits. Sunk costs should not be considered and every attempt should be made to avoid double counting. Further, the primer requires that analysis is made of underlined marginal costs and benefits, not average costs. Marginal costs and benefits measure the change in total costs and total benefits associated with the provision of one more unit – in this case one more housing unit.

The Primer recognises that although it is desirable to assign dollar values to all costs and benefits, identifying and quantifying benefits is one of the "toughest and most time consuming elements of CBA", particularly in cases where a market does not exist or market prices are not easily observable or easy to estimate, and that therefore there may be cases where all costs and benefits cannot be reliably measured or where the cost of attempting to value them outweighs the advantage of including them in the analysis.

In these cases, these intangible benefits should be "explicitly highlighted and explained in the analysis so that decisions-makers are aware of the value judgments they are making in pursuing a particular option".

NZIER Analysis

NZIER completed a report examining the relative cost-effectiveness of the following interventions:

- Build/purchase/lease of additional State housing units, in combination with Income Related Rent.

- Supporting the construction/purchase of additional non-government social housing provision through HIF/LGF, in combination with the Accommodation Supplement.

- Facilitation of first home ownership through Mortgage Insurance and Shared Equity assistance, in combination with the Accommodation Supplement.

The following table summarises the costs, net of rentals received from tenants, of housing and assistance programmes for single people. The cost calculation includes capital appreciation in respect of State houses. Equivalent tables for other family groupings are found in NZIER's detailed report[4]

Table 3 Cost Summary: Single – No Children
Dollars per household per year – Government perspective

Intervention	House Size (Number of Bedrooms)	
	1	2
State house build	3,000	4,600
HIF funded build (Local Govt)	4,800	
HIF funded build (other non-government)	5,800	
State house + IRR	8,300	12,200
HIF (LG) + AS	9,400	
HIF (Other) + AS	10,400	

The table indicates that, from the Government's perspective, State Housing is a more cost-effective means of providing accommodation than the Housing Innovation Fund. This conclusion is driven, in part, by Government capture of asset appreciation under the State Housing option. A scenario of stable house prices (rather than appreciating in real terms) would lift the cost of State House provision by $2,200 per year for a 1-bedroom unit to levels similar to those of the Housing Innovation Fund.

---

[4] NZIER, Toward an Economic Analysis of Housing Interventions, Stage 1A – Analysis of Costs, Report to Housing New Zealand Corporation, 16 May, 2007

For joint provision of accommodation and affordability assistance, State Housing with the IRR is shown to be more cost-effective than HIF and AS. However, if house prices were stable in real terms, then funding social housing through the Local Government HIF and providing the AS would be the most cost-effective option since AS is cheaper to Government than IRR, with the difference in cost borne by the tenant in the form of higher rent.

Limited information on HIF funded projects was available, and it was unclear whether these were fully comparable with State Housing. On the information available, HIF funded projects were less cost-effective than State Housing. However, this assumes on-going increases in house prices above the general inflation rate. If house prices simply keep pace with inflation, then HIF funded projects compare favourably with State Housing.

In the case of both State houses and HIF funded houses, the NZIER analysis only looked at the cost of constructing or purchasing additional properties. (No analysis was made as to the costs of upgrading existing properties, or the use of HIF to retain non-government supply relative to the cost of Housing New Zealand constructing/purchasing additional properties.)

The analysis of the costs of the *Mortgage Insurance Scheme* and the *Home Equity Scheme* is entirely dependant on key input assumptions such as the cost of the house purchased, the rate of capital appreciation, the risk profile of the borrowers and (in the case of the Home Equity scheme) the level of Housing New Zealand's equity stake.

Based on the following assumptions, the Net Present Value of potential claims cost under the *Mortgage Insurance Scheme* for 1,000 loans was $3.36 million, or negative **$3,360** per loan:

- House value is $200,000.

- Borrowers make a deposit of $5,000.

- Loan financed over 25 years at an interest rate of 7.95%.

- Borrowers are a male aged 32 and a female aged 30.

- Earning rate on accumulated insurance premiums is 5.9% net of administration costs.

- Houses prices increase at 2.5% per annum (over and above the inflation rate of 2.25%).

- Real estate commission fees are 3.25%.

With stable house prices (no capital gains), the NPV of the cash flows reduces to negative **$1,765** per loan.

Housing New Zealand is also launching a separate *Home Equity Scheme* which differs from the *Mortgage Insurance Scheme* in that it requires Government upfront investment rather than back-up support for risk. With respect to the **Home Equity Scheme**, the analysis showed an NPV over a 7 year period of negative **$5,500** per year on an annual equivalent basis, based on the following assumptions:

- House value $300,000.

- Government share 30%.

- Purchaser deposit $5,000.

- House sold in year 7.

- Capital gains (real p.a.) 2.5%.

- Inflation (p.a.) 2.25%.

- Administration and overheads ($/yr) $585.

With stable house prices (i.e. in line with inflation only), the NPV of the cost increases to negative **$8,900** per year.

6.   Housing Interventions and Initiatives

For the purposes of analysing the benefits of housing interventions for this report, the interventions are defined as follows:

- State housing investment, in combination with Income Related Rent.

- Investment in non-government social housing provision through HIF/LGF, in combination with the Accommodation Supplement.

- Facilitation of first home ownership through Mortgage Insurance and Shared Equity assistance, in combination with the Accommodation Supplement.

The interventions considered by this report directly link with the Families - Young and Old strategic policy theme by promoting investment, across both state housing and non-government social housing provision, which:

- increases the supply of affordable social housing; and

- improves the quality of the social housing provision.

In addition, the third intervention directly supports the objective within the Families – Young and Old Cabinet paper of using new approaches to support home ownership.

Initiatives

Each of these interventions are directly supported by the *NZ Housing Strategy* which sets out seven "Areas of Action". The specific initiatives which relate to the interventions identified above are:

Sustainable Housing Supply

- continue to implement the Community Renewal programme.

Affordability and Assistance (Area 2):

- increase the number of state houses and continue to modernise existing stock (Note that for the purpose of this document, this is referred to as Housing New Zealand's housing modernisation programme – where the modernisation is generally focused on improving amenity and comfort levels, without a *specific* emphasis on healthiness, although this is clearly an important objective. The focus of the modernisation programme is on the property, rather than on the tenant (as is the case for the Healthy Housing programme for example);

- review the effectiveness of the Accommodation Supplement;

- support the expansion of social housing through the Housing Innovation Fund (HIF) and the Local Government Fund (LGF) which provide assistance to community-based and local government housing providers;

- investigate demand and develop clearer funding policies and initiatives to support emergency housing; and

- explore opportunities to foster large-scale, non-government social housing providers.

Homeownership (Area 3):

- expand the Mortgage Insurance Scheme;

- explore innovative homeownership programmes including deposit assistance as part of Government's Work-Based Savings Scheme, and home equity schemes;

- develop and implement education programmes to support decision-making and sustainable homeownership; and

- develop homeownership products to meet the needs of particular groups.

Housing Quality (Area 5):

- continue to implement the Healthy Housing and Rural Housing programmes (these programmes have a very clear set of objectives focused on improving health levels for the particular families living in these properties);

- continue state housing modernisation and energy efficiency retrofitting;

- establish a database of information on housing quality, and undertake a national survey of housing that focuses initially on housing quality; and

- review the adequacy of the regulatory framework that applies to existing buildings, including the investigation of and, if appropriate, establishment of a suite of standards and tools (such as a healthy housing index) to apply across the housing sector.

Meeting Diverse Needs (Area 7):

- look at initiatives specifically targeted at improving housing related outcomes for target groups.

In addition:

- The *NZ Health Strategy 2000* includes goals to provide a healthy physical environment for all New Zealanders and to promote public health (including through improved access to public health protection services in rural areas), with a focus on clean water, sewerage and housing.

- The *Child Health Strategy (1998)* includes public health "Goals, Objectives and Targets" (Appendix 1 of the strategy) for child health similar to the NZ Health Strategy and in addition aims to reduce the adverse health effects of unemployment, income inequalities, housing, transport and illiteracy.

This report makes reference to a number of the initiatives listed above as being particularly important in delivering the benefits highlighted here including:

- increasing the number of state houses;

- modernising existing stock and energy efficiency retrofitting;

- continuing to implement the Healthy Housing programme;

- supporting the expansion of social housing through HIF;

- expanding the Mortgage Insurance Scheme; and

- exploring a home equity scheme.

Figure 3 below provides a diagrammatic representation of the intervention logic behind Housing New Zealand programmes and initiatives and the societal outcomes they are targeting. Note that in most cases there is a many-to-many relationship between interventions and outcomes, however for the purpose of this diagram we have represented only the strongest linkages.

Legend:

- Primarily driven by Housing New Zealand (with main responsibility)
- Intersection points between Housing New Zealand and other parts of Government
- Intersection points between Housing New Zealand and the third sector

NZ Social Housing Outcomes
Contributing to Families Young and Old
(through Housing New Zealand Interventions)

Health and Disabilities

- Reduce hospitalisations
  - Reduce over-crowding
    - Healthy Housing Programme (over-crowding emphasis)
    - Build/ purchase additional State houses
    - Retain third sector houses through HIF injections
    - Build/ purchase additional third sector houses using HIF
    - Third sector Healthy Housing initiatives aimed at reducing over-crowding through HIF
- Reduce GP Visits
  - Reduce Damp/ mould
    - Healthy Housing Programme (housing quality emphasis)
    - State house modernisation programme
    - Third sector Healthy Housing initiatives aimed at upgrading existing housing quality through HIF
    - Third sector Healthy Housing modernisation initiatives through HIF
  - Increase indoor temperature
    - Healthy Housing Programme (insulation emphasis)
    - State house modernisation programme
    - Third sector Healthy Housing initiatives aimed at improved insulation through HIF
    - Third sector Healthy Housing modernisation initiatives through HIF
- Improve well-being
  - Improve Information Access
    - Community Renewal Programme aimed at information dissemination to target groups
    - Third sector programmes through HIF aimed at information dissemination to target groups
  - Target needs of most vulnerable
    - Modernise State houses for disabled
    - Modernise third sector houses for disabled
    - Community Renewal Programme aimed at improving sense of community
    - Healthy Housing Programme (well-being emphasis)

Education and Productivity

- Improve levels education participation & achievement
  - Target school students seeking NCEA L2
    - Build/ Purchase State houses designed to facilitate study
    - Modernise State houses to improve amenity for study
    - Community Renewal Programme (access to education emphasis)
    - Build/ purchase additional third sector houses through HIF (suitable for family with teens)
    - Modernise third sector houses through HIF to improve amenity for study
    - Retain third sector houses through HIF injections (suitable for family with teens)
- Increase Labour productivity and utilisation
  - Target access to employment
    - Provide flexibility to live near employment through AS
    - Build/ purchase State houses with easy access to centres of employment
    - Build/ purchase third sector houses with easy access to centres of employment through HIF
    - Modernise State houses to improve fit to working families in need
    - Community Renewal Programme (access to employment emphasis)
    - Mortgage equity scheme to facilitate home ownership near employment
    - Mortgage insurance scheme to facilitate home ownership near employment

Safety and Security

- Reduce Homelessness
  - Improve alignment between agencies
    - Community Renewal Programme targeting cross-sectoral collaboration
    - Third sector programmes through HIF targeting cross sectoral collaboration
  - Remove Barriers
    - Build/ purchase additional State houses specifically aimed at homeless
    - Build/ purchase additional third sector houses specifically aimed at homeless
    - Income Related Rent paid through WINZ
- Reduce crime
  - Target building security & personal safety of tenants
    - Modernise State houses to improve safety/ security
    - Modernise third sector houses to improve safety/ security using HIF
    - Build/ purchase safe/ secure third sector houses through HIF
    - Build/ purchase State houses (safe/ secure)
    - Community Renewal Programme (crime reduction emphasis)
- Increase social cohesion
  - Improve family stability & reduce discrimination
    - Mortgage equity scheme to encourage home ownership & improve family stability
    - Mortgage insurance scheme to encourage home ownership & improve family stability
    - Community Renewal Programme (social cohesion emphasis)
    - Work with third sector to reduce discrimination in housing access
    - Encourage community diversity – mix of housing through HIF

Family Stability

- Provide buffer against poverty
  - Target home ownership and insurance
    - Mortgage equity schemes increases value of housing stock
    - Mortgage equity and insurance schemes provide buffer against poverty
    - Mortgage equity and insurance schemes increases knowledge of population about home ownership

* These boxes are not drawn to scale
* Boxes highlighted in yellow are three priority outcomes

Note that:
* Interventions have been classified under the outcomes to which they most strongly relate. In reality most interventions have a relationship with most outcomes.
* Income Related Rent (IRR) is not shown as an intervention as it does not directly relate to any outcome. Transfer payments of themselves do not deliver direct societal benefits.

Figure 3 *NZ Social Housing Outcomes*

7. Benefits Analysis Approach

The purpose of this benefit analysis is to understand the average and marginal benefit for each intervention with the aim of showing which intervention(s) provide the greatest benefit in the context of a constrained Housing New Zealand budget. The results of the quantifiable benefits analysis are to be taken in context with the many unquantifiable benefits which arise from providing housing assistance.

In an environment of unconstrained resources the theoretical framework for evaluating the effectiveness of housing interventions is relatively clear. An optimal state is reached when:

- the net marginal benefits of each intervention are equal; and

- the net marginal benefit of additional intervention is nil.

In other words a point has been reached at which all interventions are delivering equivalent benefits and furthermore, no additional investment in any of the set of interventions identified will yield any additional benefit.

While the principles set out above hold in either a purely commercial/private sector or a public/mixed environment, additional complexities arise with the theoretical model in a public/social context. In particular:

- benefits are less easy to link to actions;

- benefits are more complex to quantify; and

- disaggregating benefits between those of a public and those of a private nature requires significant judgement and will lack precision.

Theoretical Framework

The benefits provided by housing services are based primarily on the preferences and beliefs of the consumers of those services – it is the "utility" or "value" of these services to the tenants which generally provide the greatest benefit (i.e. the "private good" benefits to the household members).

However society also places a value on the provision of adequate shelter to all members of society since such provision delivers wider value (or "welfare") to society such as improved health outcomes (i.e. "public good" or public benefits). In our analysis we treat the public good arising from an intervention as being the benefit to the wider society and the private good as being the benefit to the tenant/ household recognising that many benefits have both a private and a public dimension. For example improved health has both a benefit to the individual and to society. In our analysis we are primarily concerned with the societal/public good benefit – accepting that there are significant grey areas between the two.

As described above marginal costs and benefits measure the change in total costs and total benefits associated with the provision of one more housing unit (whether this be through direct provision or facilitated home ownership).

In theory, in order to calculate the value placed on one more unit of housing assistance it is necessary to quantify a "total benefit" schedule where total benefit is the total value placed on a given level of provision of housing assistance which delivers a public good benefit to society. The greater the quantity, the larger is the total benefit, up to a maximum level. The increase in total benefit resulting from adding one more unit to the quantity of a housing assistance is the marginal benefit.

To determine the efficient (or optimal) quantity of provision it is necessary to take cost as well as benefit into account. The optimal quantity is the one that maximises net benefit – total benefit minus total costs. Therefore:
- When marginal benefit exceeds marginal cost, net benefit increases if the quantity provided increases.
- When marginal costs exceeds marginal benefits net benefit increases if the quantity provided decreases.
- When marginal benefit equals marginal cost, net benefit cannot be increased – it is at its maximum.

Generally it would be expected that marginal benefits will decline beyond a certain point as volumes increase – in other words, if provided assistance is targeted at those with greatest need first the benefits of providing more assistance will reduce as needs lessen. Similarly, as more and more resources are purchased generally it would be expected that costs will rise – as competition for these resources drives up the price. This relationship between declining marginal benefits and increasing marginal costs can be displayed as follows:
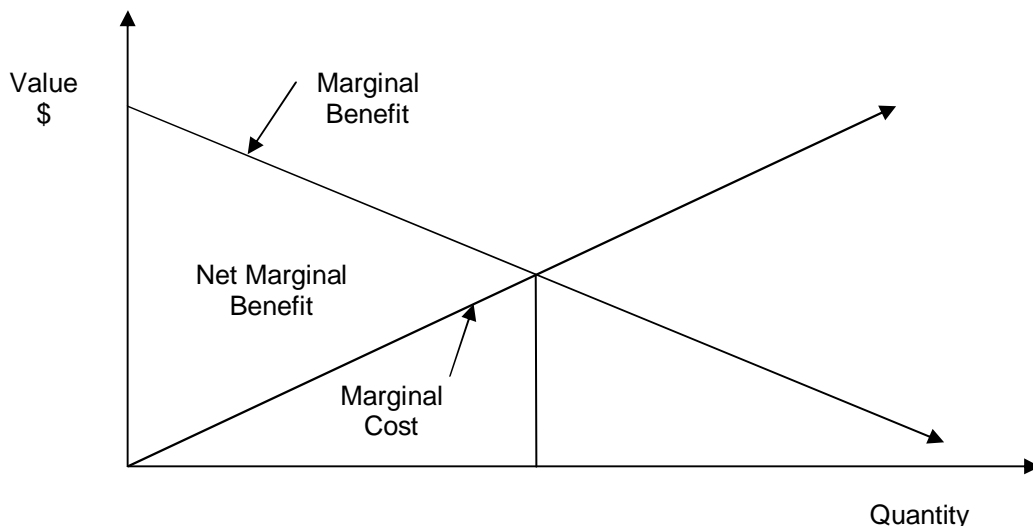
Figure 4 *Maximum Net Benefit (illustrative only)*

In the context of the decisions faced by Housing New Zealand/Government the ideal model to calculate quantitative benefits and costs would incorporate a hierarchy of costs and benefits for each intervention. For each category of cost and benefit, marginal cost and benefit curves would be constructed so that the relative costs and benefits could be evaluated within a common framework.

Part of this modelling process would involve establishing the nature of the marginal unit under each of the interventions, eg access to accommodation for one person, a family unit, a certain size of family, or a family with certain characteristics. Assumptions would also be needed to be made as to the quality of the intervention – for example location or quality of facilities. Also, the analysis would need to be forward looking. While historic data may provide some guidance for the process of evaluating future investment decisions the cost and benefit analysis needs to be forward looking.

In an efficient market where asset prices, income, and costs streams are set in the same market it is reasonable to assume that over time there will be a correlation between costs (asset prices) and financial benefits (net income streams comprising rents and capital gains less costs) from those assets such that the net present value (NPV) of investment decisions at the margin is zero. Indeed, Housing New Zealand's own investment decision making requires investments in new properties to be NPV positive.

NZIER have undertaken some analysis of the costs of the different interventions and this provides a useful start point for determining the marginal cost of each intervention.

While the NZIER analysis is based on average costs by intervention it would seem practical to assume that within reasonable boundaries of scale the marginal cost curve of the different interventions would be relatively flat. In other words a new house costs a certain amount to construct irrespective of whether one house or a hundred are constructed (putting aside issues of volume discount/ economies of scale) or whether the house is purchased by Housing New Zealand or by a non-government social housing provider supported by funding through HIF. Similarly it is reasonable to assume that the marginal cost curve of interventions to facilitate home ownership will also be relatively flat.

Given this assumed behaviour of costs it is the trend in marginal benefits that is likely to dictate the optimal level of intervention.

In relation to direct provision by Housing New Zealand, the NZIER cost analysis does pick up part of the financial benefit associated with property ownership in the private sector – being IRR plus capital gain. Therefore, in relation to direct provision by Housing New Zealand in theory the only financial benefit not factored into the economic analysis is the difference between a market rent and the IRR. The Crown compensates Housing New Zealand for this difference – with the consequence that Housing New Zealand's investments in new properties will typically be NPV neutral or positive (although there will be circumstances where this is not the case). The difference that is paid by the Crown between the IRR received by Housing New Zealand from the tenant and the market rent is the price the Crown is prepared to pay for the societal benefits associated with the provision of appropriate and affordable housing to those in need.

As relative need declines the benefits associated with the intervention decline and the price the Crown should pay to support the intervention should similarly decline. Given that the Crown is paying for both quantifiable and non quantifiable benefits in its rental subsidy it is unlikely that the quantifiable benefits alone will exceed quantifiable marginal costs.

Because marginal costs (costs to construct, maintain etc) and marginal benefits (rents, capital gains) are predominantly set by the private sector in a competitive market it is unlikely that there will be sufficient quantifiable financial benefits of a societal nature such that the marginal quantifiable benefits of the next unit of intervention exceed the marginal cost of that unit. This could only occur if these societal financial benefits were sufficient to close the gap between the IRR and market rent. However it should be possible to at least

develop a framework to assess the point at which marginal benefits have diminished significantly. The focus would then be on:

(i)   further research/ analysis to enable a more comprehensive quantification of benefits where this is possible;

(ii)   the identification and evaluation of non quantifiable benefits to provide comfort that these are sufficient to warrant further intervention or to maintain existing level of intervention; and

(iii)   the point or points at which quantifiable and non quantifiable benefits begin to decline markedly.

Therefore the framework is as follows:

Value
$

Marginal
Cost

Quantifiable
Marginal
Benefit

Quantity
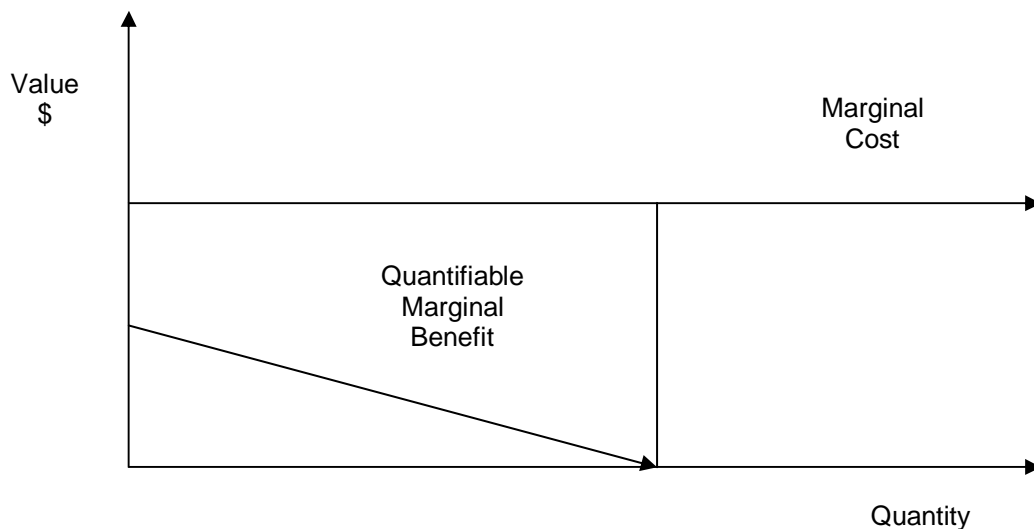
In this framework it is likely to be difficult to distinguish between the benefits offered through the provision of social housing by Housing New Zealand and non-government social housing given that both are directed at the delivery of appropriate accommodation to those in need – i.e. the benefits arising from a person or persons being housed in appropriate accommodation must largely be the same, it is just the means and cost (in NPV terms) of achieving the "right" outcome that differs.

Assuming this logic the focus of any cost benefit analysis then shifts to:

(i)   the least cost of delivering the right solution;

(ii)   the characteristics of the "right solution" – i.e. for a given household what attributes should a property have such that the benefits assumed to be consistent with desired public good outcomes are delivered, and how do these benefits abate/increase as the quality (and cost) of the property increases/decreases; and

(iii)   the ability to better analyse "demand" within the groups such that the marginal benefit of each new unit of provision can be assessed with a view to determining the maximum marginal benefit (the benefit of matching the next intervention to where there is greatest need) and the extent to which benefits decline as needs progressively reduce.

In relation to (i) the "right" solution implies the correct matching of provision to need. Therefore when analysing the net benefits of direct provision between Housing New Zealand provided property (with IRR support) and non-government social housing support the relevant information combines:

- the relative cost of the intervention; and

- the accuracy of the targeting of the intervention.

In order to assess the latter of these points the analysis referred to in (ii) and (iii) above is necessary.

To the extent that it is not possible to disaggregate need/ demand with any great precision initially it is likely that benefits will need to be attributable to relatively broadly defined groups. In this situation the marginal benefits "curve" is more likely to look as follows:

As more information becomes available to analyse needs the marginal benefits line will move from a step function to a downward sloping line.

In this paper we:

(i)   propose a framework for quantifying the costs and benefits of the different interventions;

(ii)   where possible, incorporate the findings from NZIER in relation to the cost of these interventions;

(iii)   identify the benefits attributable to each intervention;

(iv)   where benefits are quantifiable and sufficient data is available, propose formulae for quantifying benefits;

(v)   where benefits are quantifiable but insufficient data is available to undertake any quantification we identify the research/analysis workstreams necessary to close these data gaps; and

(vi)   where benefits are not quantifiable we propose that further work be undertaken to develop a mechanism for "valuing" or "rating" these in non financial terms.

Note that no benefits are directly ascribed to IRR or AS since these are effectively transfer payments within the Government's welfare system; however it is not possible to identify the benefits of each of the above interventions excluding these affordability measures as they are inextricably linked.

In addition, given the Target Groups for social housing described above, it is clear that without the affordability assistance provided through IRR and AS, the benefits identified from the interventions would be less likely to be received by those considered to be in greatest need.

There is also research[5] which supports the hypothesis that marginal improvements to levels of parental income, particularly for low income households, results in improved outcomes for children across a range of measures, independent of other factors such as the housing environment. These improved outcomes may not be marked but are nonetheless statistically relevant. No attempt has been made to measure these benefits.

For each housing intervention a range of quantifiable and non-quantifiable benefits can be identified as outlined at a high level in Table 4:

Table 4 Overview of Benefits

Intervention	Benefits to Tenants	Potential Benefit to Society
Investment in State Housing/IRR	- Provision of shelter to those in need. - Healthier living environment. - Helps increase income, cheaper rent. - Facilitated community involvement/attachment. - Greater ability to participate in education and training, and higher levels of achievement. - Improved safety and security – less likely to be a victim of crime. - Improved amenity levels. "Good landlord", including security of tenure, property maintenance.	- Enhanced family well-being. - Healthier population. - Greater education participation (lower truancy and drop-out levels) and achievement. - Lower levels of crime. - Greater labour market participation, reduced reliance on benefits. - Reduced numbers of people "detached" from society.
Investment in non-government social housing provision through HIF/LGF/AS	- Assuming loans are tied to both quantity and quality criteria for supply of social housing then as above, but in addition, **AS:** - Allows people to retain control over where they live – closer to employment and education/training opportunities. - Allows a greater choice in the type and location of rental accommodation. - Helps increase income. - Allows homeowners with mortgages to continue to live in their own home.	- As above, but in addition, **HIF:** - Strengthens local authority commitment to remain in social housing. - Funded projects provide tailored local housing provision to specific client groups. - Provides greater flexibility to provide housing closer to employment and training opportunities

---

[5] "The Influence of Parental Income on Children's Outcomes" Susan E. Mayer. Published by Knowledge Management Group, Ministry of Social Development, 2002. Refer also Appendix A.

Intervention	Benefits to Tenants	Potential Benefit to Society

Facilitation of first home ownership	• Assisted into home ownership, which provides:
	  o Housing as an investment/form of compulsory savings;
	  o Greater security of tenure;
	  o Feeling of wellbeing;
	  o Greater choice of location – closer to employment and education/training opportunities; and
	  o Ability to carry out "DIY" improvements to increase house quality in terms of healthy environment of energy efficiency.
		• Enhances family stability and improves the connections families have with their communities.
		• Provides a buffer against poverty.
		• Encourages sustainable labour market participation.
		• Fewer hospital admissions.
		• Contributes to improving the overall quality of housing.

This analysis focuses on the potential benefit to _society_. In all cases the benefit to the tenant (the private good) is likely to exceed the benefit to society as a whole (the public good). Further, as household income increases, the benefits to society are likely to reduce at a faster rate than the benefit to the tenant as the ratio between public and private good swings more towards the private good.

What the table above demonstrates is that a substantial part of the benefit associated with adequate, affordable housing will be common across the different interventions. In evaluating between interventions the critical question is the extent to which the different interventions, which deliver outcomes additional to that offered by direct provision via Housing New Zealand, create marginal benefits relative to that generated through direct provision. For example home ownership is assumed to lead to:

• greater family stability;

• improved connections families have with their communities and continuity of educational opportunities;

• long term security;

• a major buffer against poverty;

• benefits from housing as an investment and a form of compulsory saving relative to renting;

• control over quality of housing; and

• better match between household and house

In terms of the quantification of these benefits, from a societal perspective, it is necessary to:

(i)   validate the proposed outcomes;

(ii)   link the proposed outcomes to specific benefits; and

(iii)   quantify the benefits relative to those that accrue from either the direct provision of rental accommodation (by Housing New Zealand in the non-government social housing) or through income support.

Even if the propositions can be validated and the link to marginal benefits established the quantification of benefits will remain complex. For example if home ownership contributes to the creation of household wealth then the benefits could include direct benefits to the Government in terms of a higher tax/lower transfer payments but also second order benefits in terms of better health outcomes, better educational outcomes and a lower propensity for criminal activity and increased quality of housing.

Figure 5 below provides another way of assessing the intervention linkages by examining the quantitative and qualitative benefits to society which are considered to be derived through the provision of high quality social housing. This diagram does not attempt to show the relationship between each sub-category of intervention (whether that be through HIF loans to fund modernisation of non-government social housing, or Housing New Zealand's Healthy Housing programme of investment, for example), but rather demonstrates the expected relationships between outcomes and benefits. Note that the focus is on benefits to society, not benefits to tenants, which would be much more extensive.

This diagram clearly shows the relationship also between qualitative benefits (i.e. benefits which can not be measured in a financial sense) and quantitative benefits where it could be possible to place some sort of financial value on the benefit to society.
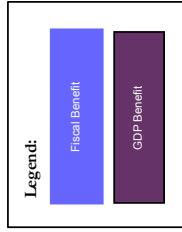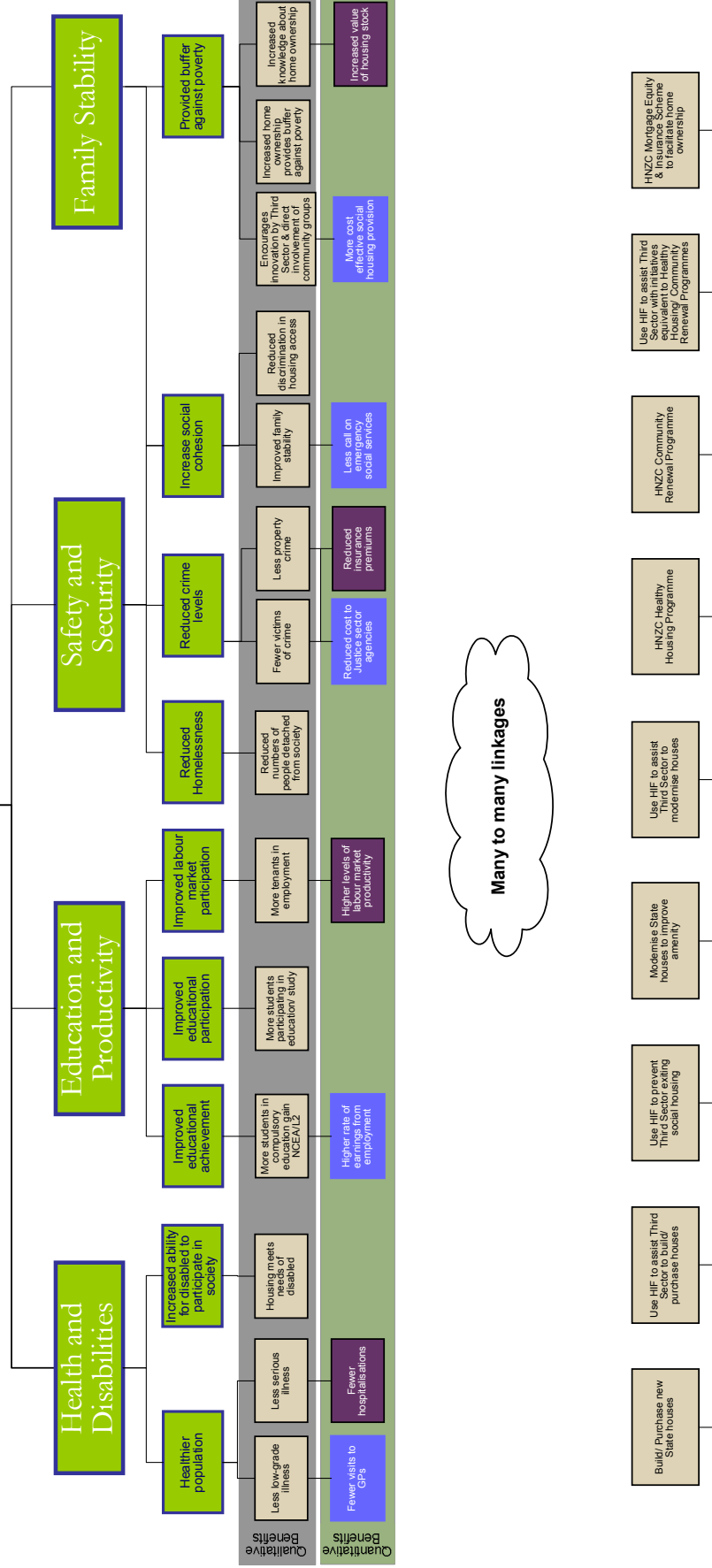
Figure 5 *Relationship of NZ Social Housing Outcomes to Housing New Zealand Interventions*

8. Benefit Categories and Cost-Benefit Analysis

There are two key categories of benefit:

- A **Base** level of benefit to society derived by providing appropriate[6] accommodation to those on waiting lists; and

- A **Supplementary** level of benefit to society derived by providing accommodation which meets housing quality standards, for example in respect of healthy housing (which is the specific focus of the Healthy Housing programme, but is also an objective behind ongoing housing modernisation), amenity levels (targeted through housing modernisation programmes and new housing acquisitions) and community integration (which is, for example, a specific objective of the Community Renewal programme).

At the current point in time, the greatest level of benefits to society seem likely to be derived from investment in new, additional state housing (or equivalent non-government social housing). This is because:

- There is currently a long waiting list for social housing, by prospective tenants classified as high priority. This means that each of these families housed in a new house is able to access the double benefit of moving out of less suitable accommodation into accommodation better suited to their needs (the Base level of benefit), and *in addition*, moves into a property which is fully compliant with Housing New Zealand's housing quality standards, i.e. is built to the same level or better than an existing property which is upgraded through Housing New Zealand's housing modernisation programme, Healthy Housing or Community Renewal programmes or equivalent initiatives in the non-government social housing sector (the Supplementary level of benefit).

- Existing Housing New Zealand or non-government social housing tenants who live in properties targeted for investment through modernisation, Healthy Housing or Community Renewal initiatives receive significant levels of benefit (much of which flows through to society, e.g. improved health levels), however as they are already social housing tenants, the level of benefit is less than for those on waiting lists (they receive the Supplementary benefit only).

---

[6] In this context, appropriate is defined as meeting basic needs such as location and configuration. It does not refer to other indicators of quality which are used to measure healthiness, amenity levels and security (for example).

The figure below demonstrates the theoretical relationship between marginal benefits of additional (new) intervention and the average benefits across all interventions – both existing and new.
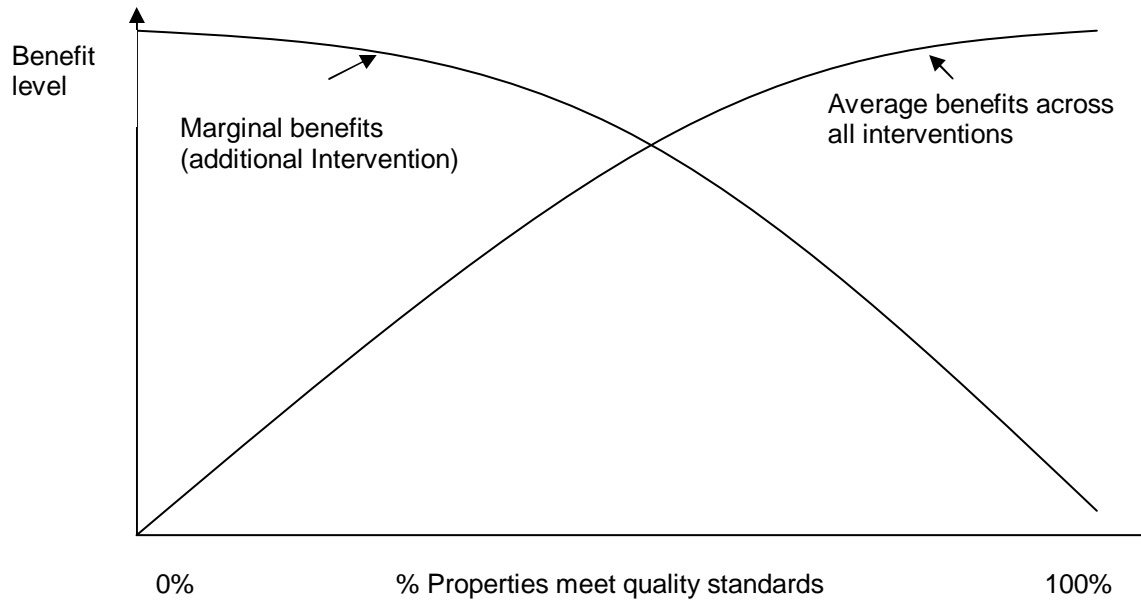
Figure 6 *Marginal and Average Benefits of Investment in* <u>*Existing*</u> *Social Housing Properties*

At the present time, the marginal benefit for each type of intervention provides additional benefits to existing and prospective tenants which are not being received by all existing tenants. For this reason, assuming that less than 50 percent of existing properties meet Housing New Zealand's housing quality standards, the marginal benefits of intervention will exceed the average benefits of social housing across all existing tenants, as shown (illustratively only) in Figure 6.

The simplified diagram above is representative of the situation where Supplementary levels of benefit are being generated through investment in existing properties. In situations where new social housing is being added to the portfolio, and consequently generating both Base level benefits and Supplementary benefits, the situation is more complex, as shown in Figures 7 and 8.
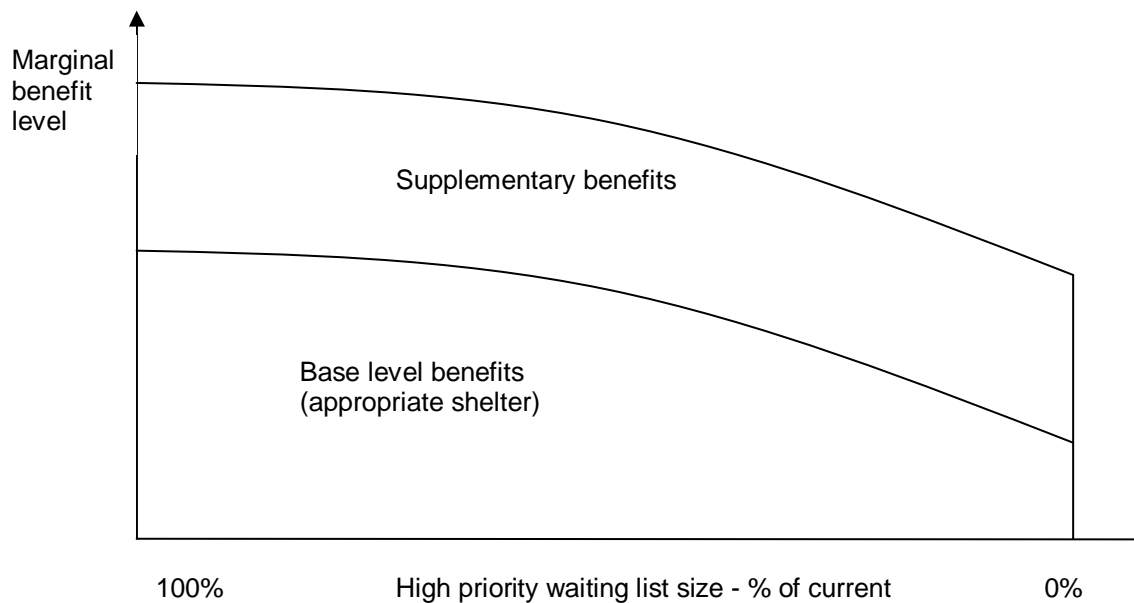
Figure 7 *Marginal benefits of Additional High Quality Housing*
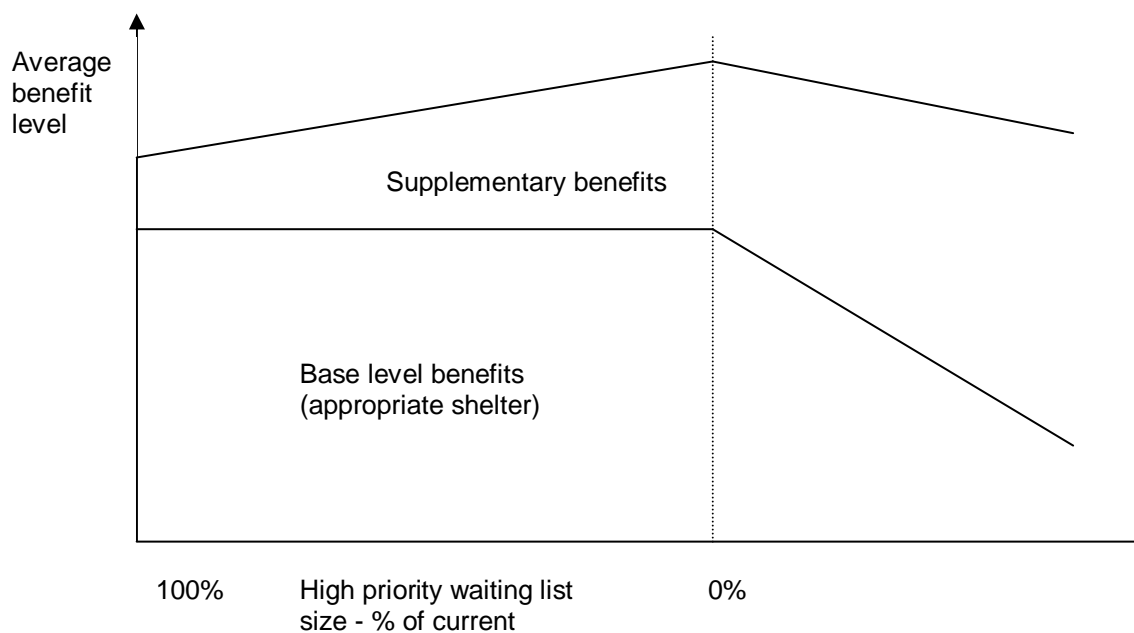
Figure 8 *Average Benefits across all Tenants of Additional High Quality Housing*

As these diagrams show, as the waiting lists reduce to the point where there are very few or no applicants classified as high priority, then it is likely that:

- The marginal benefit of further investment in additional housing (to accommodate those on waiting lists) will reduce as the Base level benefits drop away;

- The marginal benefit of further investment in additional housing may still be higher than the average benefit across all social housing tenants to the extent that new tenants receive some level of Base benefit in addition to the Supplementary benefits of moving into high quality housing; and

- As the Base level of benefit reduces, the marginal benefit of providing an additional property converges on the marginal benefit of upgrading an existing property and is therefore likely to be lower than the average benefit across all social housing tenants. Consequently it is also likely to lose cost effectiveness as an intervention relative to the cost effectiveness of upgrading existing properties.

Average vs Marginal Benefits of Additional Interventions

For each of the above benefits discussed above (e.g. benefits of a new State house) the inherent assumption is that each additional unit invested in of a certain size will provide the same level of average benefit (i.e. that the marginal benefit of each additional house is the same as the average benefit of all additional State houses).

For this assumption to hold true, there is required to be a large population of need where households which are either current state house or non-government social housing tenants or on waiting lists for such houses have on balance equivalent needs. At the present time, this assumption appears to be true (refer discussion under Communities of Need below).

There is a significant difficulty in distinguishing between average and marginal benefits for additional interventions in a situation where it is not possible to ascertain the specific benefits attributable to the next recipient of a specific intervention. If there was:

(i)   confidence that interventions were initiated on the basis of need, with those most in need attended to first; and

(ii)   it was possible to distinguish between the benefits attributable to Housing New Zealand versus non-government social housing providers.

then it may be possible to construct a benefit curve such that marginal benefits could be assessed.

As matters stand at best it is possible to attribute marginal benefits to a group of prospective beneficiaries (for example waiting list designated A or B), but within that designation it is very difficult to distinguish on the basis of relative need.

Communities of need

There are a number of reasons why interventions are required. In order of priority (arguably) these are probably encompassed by the following:

1. Ensuring all New Zealanders have shelter.

2. Increasing level of healthiness of housing.

3. Meeting the needs of vulnerable members of the community.

4. Reducing levels of crime experienced by those living in communities dominated by low income housing.

5. Improving social connectedness and in particular improving education and employment outcomes by those living in communities dominated by social housing.

6. Improving family stability, in particular through improving levels of home ownership.

Once these needs are met or largely met, the need for additional investment in interventions is reduced or possibly even removed entirely. It is therefore useful to understand the extent of the "unmet" need in New Zealand society as this will inform understanding of the marginal benefits of further investment.

Ideally this would require assessment of:

- current levels of homelessness (transient, in temporary accommodation or on the street);

- current levels of over-crowding;

- numbers of households living in unhealthy housing (other than as measured by overcrowding);

- numbers of "vulnerable" households living in unsuitable accommodation;

- numbers of households living in communities where rates of personal and property crime are particularly high; and

- numbers of households living in communities where rates of education and labour market participation are particularly low.

However, since this information is not available or incomplete, a possible proxy may be to examine the nature of the existing Housing New Zealand waiting lists on the basis that many of those in the community of need described above will "self-select" by placing themselves on waiting lists, and further that the waiting list prioritisation process (A through D) will allow for more targeted identification of need.

Analysis of Housing New Zealand's "Key Facts" publications reveals that:

Table 5 Analysis of Housing New Zealand's Key Facts

Key Facts	April 2007	May 2007
Total waiting list	10,255	10,088
Total A + B (highest priority)	3,769	3,672
Average age of total waiting list	263 days	260 days
Average age A + Bs	166 days	166 days
New additions to waiting list – all	1,734	2,177
New As + Bs	1,098	1,301
Number housed in state house - all	688	979
Number As + Bs housed in state house	591	825
Number exited[1] waiting list - all	1,084	1,365
Number exited waiting list As + Bs	490	661
Net increase/decrease to waiting list – all	(38)	(167)
Net increase/decrease to waiting list – As + Bs	17	(185)

[1] Exited waiting list includes those who "time out". These may be re-circulated back onto new additions. It is not possible to identify these rotations.

It is not possible to determine what proportion of A/B priorities have 'special needs' – i.e. vulnerable household such as disabled persons.

This information *excludes* waiting list data for non-government social housing which is not available. It also excludes any households in need who do not 'self select' by placing themselves on a waiting list. The BRANZ Ltd Housing Condition Survey [7] found that 16% of the houses surveyed were in "poor" overall condition. Given that New Zealand has around 1.5 million dwellings, this suggests that many more families may be living in sub-stand housing conditions than are represented by Housing New Zealand's waiting lists.

However, looking at the waiting list information alone does serve to demonstrate that there appears to exist a fairly high level of unmet demand for housing interventions and it therefore seems likely that the average value attributed in this paper to each intervention (per property) would also be equal to the marginal value for a significant number of additional properties or the overall condition of New Zealand dwellings.

The marginal value of each intervention (additional state house or non-government social house) may start to decrease when another 2,000 to 3,000 additional properties have been added – however this does not account for investment in upgrading existing properties.

It is important to recognise that these figures are at best very rough proxies only based on analysis of waiting lists at a point in time. A great deal of care needs to be taken in interpreting these figures, taking into account the following:

- As Housing New Zealand carries out housing modernisation and implementation of programmes such as the Healthy Housing and Community Renewal programmes, tenants may be temporarily moved onto waiting lists; and

- Different regions across NZ are likely to interpret levels of priority in different ways, particularly at the margins – there a prospective tenant classified as a category C in one region, may be classified at a B in another.

NOTE: Assessing the quantum or magnitude of benefit to society also requires consideration of the characteristics of the recipients of the intervention. This is particularly important when considering the marginal benefit of each additional dollar invested. This can be shown in the diagram below:
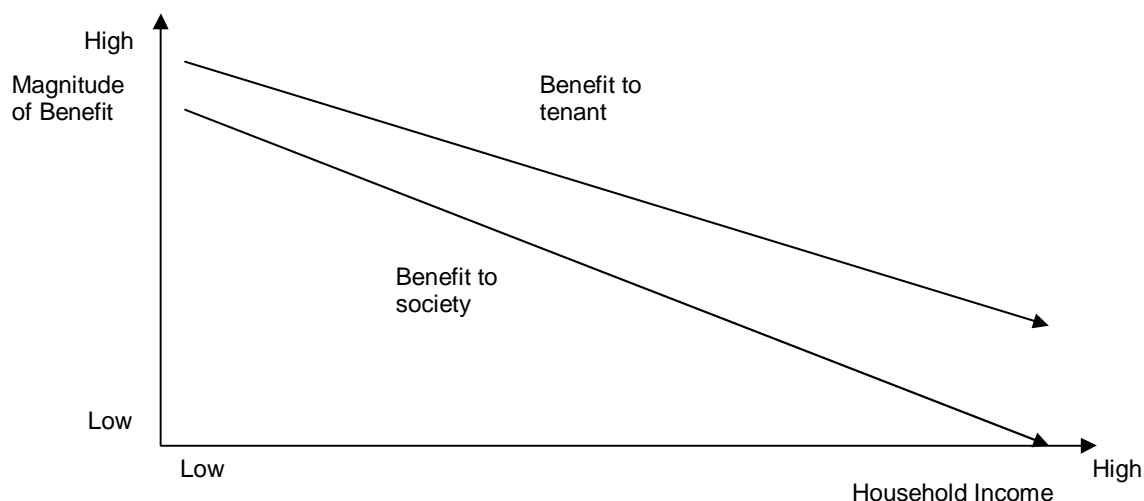
Figure 9 *Relationship between household income and benefits*

[7] BRANZ STUDY REPORT No. 142 (2005) NEW ZEALAND 2005 HOUSE CONDITION SURVEY Susan J. Clark, Mark Jones & Ian C. Page

For this purpose, it is necessary to make the simplifying assumption that households with lower levels of income are likely to receive higher levels of benefit from an intervention, and further that society is likely to receive higher levels of benefits roughly proportionate to the higher level of benefits to the tenants.

Taking this logic a step further, it seems likely that interventions which provide accommodation to those with special need (for example, disabled or otherwise disadvantaged tenants such as refugees new to NZ) as well as low incomes are likely to provide the highest levels of benefit since society tends to recognise a higher level of welfare (generally unquantifiable) associated with meeting the needs of these groups – particularly when there is market failure to do so. There is also a relationship between household size and composition and level of benefit since it is obvious that different household sizes and compositions will receive different and therefore higher/lower levels of benefit from each type of intervention, and these differing benefits to tenants will also tend to lead to differing benefits to society. However, the correlation between the benefit to society and the benefit to tenant will differ across interventions and in addition the correlation between household size/composition and type/level of benefit will also vary. This is discussed further in the next chapter

Cost-Benefit Analysis

The discussion above relates only to benefits and ignores the relationship between costs and benefits. If the cost of providing an additional high quality property to the portfolio was the same as upgrading an existing property then the net benefit of providing an additional high quality property would always be higher than the net benefit of upgrading a property since, as discussed above, the benefits (Base and Supplementary) will be greater. However, this will clearly not be the case in most situations and hence, to determine whether there is a higher net benefit from investment in additional houses compared against investment in existing houses will depend on:

- The relative marginal costs of building, or purchasing an additional good quality property over and above the cost of upgrading an existing property compared against the additional marginal benefits derived from adding that property (the difference in benefits relating to the Base level benefits depicted in the diagrams above);

- The relative costs of upgrading different properties in the current social housing portfolios, compared against the benefits to be gained from making that investment (the difference in benefits here relates to the Supplementary level of benefits – i.e. some properties will be cheaper to upgrade than others and yet may yield similar levels of health and other Supplementary benefits for existing tenants); and

- The opportunity costs of not making the investment – for example, HIF loans made to prevent non-government social housing parties exiting social housing to reap capital gains may generate significant net benefits when the alternative is to directly invest in new properties to replace those lost from the sector. The magnitude of this net benefit will depend on the quality of the properties which would otherwise have been lost and the relative stability or otherwise of the local housing market.

Using the data provided by NZIER, it is only possible to analyse the possible net benefits of investment in additional (new build or purchased) social housing properties as the cost analysis did not look at the cost of investing in existing properties or of supporting non-government social housing parties to continue to provide social housing.

9.   Quantitative Benefits

Benefits to society primarily relate to health and education outcomes, together with labour market participation, increased quality of housing stock and reduced criminal activity. It would be desirable to apply quantitative measures to each of these benefits in order to enable a complete economic cost-benefit analysis.

However, the reality is that there is insufficient data currently available to place reliable monetary measures on all these outcomes and it is therefore necessary to either find substitute proxy measures for a subset of the benefits, or to simply recognise the limitations of the data available and revert to a qualitative discussion of the benefits. At the end of this report (refer section 11. Conclusions and Recommendations), there are recommendations made as to areas where further research would allow for a more robust benefit analysis to be carried out in future.

We have reviewed the research carried out by or on behalf of Housing New Zealand and the Centre for Housing Research Aotearoa New Zealand (CHRANZ) and also by/for the Ministry of Social Development (MSD), the Ministry of Health, the NZ Council for Educational Research (NZCER) and BRANZ and identified three key areas where indicative quantitative analysis is possible, using the data currently available. These three areas can be classed into two categories as follows:

Category 1: research data available to support relationship between housing interventions and benefits but the analysis is incomplete:

- **Health** outcomes as measured by levels of hospitalisation and the costs to the taxpayer of hospitalisations. Benefits in terms of wider health outcomes as measured by, for example, GP visits, are not able to be measured as the research has not been carried out.

Category 2: research available to support the relationship between housing interventions and benefits, but the nature of the research does not allow for quantification of benefits:

- Improved rates of compulsory **Education** participation, as measured by higher levels of educational attainment (highest school level qualification), with the benefit to society being measured as fiscal benefit to the Government from higher average wages which are associated with higher educational attainment.

- Reductions in **Crime**, as measured by levels of crimes reported and/or criminal convictions and the costs to the taxpayer of police time, costs to the Courts, and costs to the Department of Corrections for prisoners held on remand or incarcerated following conviction.

Other outcomes, including labour market outcomes and the broader benefits in respect of post-compulsory education, public health (reduced levels of illness epidemics, for example), and the reduced cost to the victims of crime are areas which could possibly be measured quantitatively if research were to be undertaken and a detailed input-output economic model constructed[8], but at the present time are only able to be discussed in a qualitative sense. Wider benefits again such as benefits relating to improved social cohesion, family stability and reduced levels of discrimination in housing access are not able to be measured in any meaningful quantitative sense. In many respects these wider

---

[8] The construction of such a model is outside the scope of this project. Such a model would represent a very ambitious undertaking and possibly take several years to complete.

benefits are just as, if not more important, as the narrow set of benefits which we have been able to quantify.

Even with the three identified areas for quantitative analysis, there remains significant difficulty with the available data to accurately assess their values. Because of this, a cost constrained cost-benefit analysis is unable to be accurately completed. This report only quantifies those benefits where financial data is currently available, and makes recommendations as to further analysis which should be carried out by Housing New Zealand and/or other related agencies, to allow a more complete benefit analysis to be built over time.

Quantitative Summary

The costs and benefits which we have been able to quantify are set out in the table below:

Table 6 Costs and Benefits

Annual Equivalent Cash flow $ per household (based on average occupancy for each type)	Additional state house Single adult One child	Additional non-government social house – Local Govt Single adult	Modernisation (using proxy of data from Healthy Housing programme evaluation) Two adults Four children
Cost to society			
Cost per NZIER [9] - excl. IRR/AS	(4,600)	(9,600)	(3,033)
Cost per NZIER [10] - incl IRR/AS	(11,800)	(12,100)	NA
Benefits to society			
Category 1 Benefits [11]			
Health benefit – value of additional household off waiting list into additional house	91	30	NA
Health benefit – value of Healthy Household programme (and additional benefit of new house meeting quality standards)	300	100	600
Category 2 Benefits [12]			
Education benefit	517	0	1,033
Crime benefit	NA	NA	NA
Total benefits (Category 1 and 2)	908	130	1,633

NA = Data not available or unable to determine reliable assumptions

These figures are based on the construction of an average sized house and occupancy for each category. The health benefit is assumed to accrue to all household members, while the education benefit is assumed to accrue to the child / children only. Equivalent figures are available for other house configurations and household compositions.

---

[9] Refer to NZIER report "Towards an Economic Analysis of Housing Interventions: Stage 1A – Analysis of Costs". Cost of new house, excluding IRR/AS

[10] Refer to NZIER report "Towards an Economic Analysis of Housing Interventions: Stage 1A – Analysis of Costs". Cost of new house, including IRR/AS

[11] Refer above – supported by empirical research

[12] Refer above, - not supported by empirical research

Crime benefits are not shown in the table above as there is no basis on which to assume a rate of reduction of crime per household, regardless of its composition. According to research carried out by the Treasury[13], the benefit to the Government (fiscal cost) per crime not committed is $3,457.

As discussed, there is currently little data available to support the quantification of benefits to society. The health benefits able to be quantified based on existing benefits remain small, and other suggested benefits are entirely hypothetical. This analysis indicates a substantial gap between the cost of housing interventions and the benefit to society.

In our opinion this does not necessarily lead to the conclusion that the benefits of housing interventions exceed the costs due to the following factors:

- the incompleteness of the data/research available to support a quantitative analysis of the three specific indicators included in the table above;

- the analysis is largely based on fiscal benefits to Government only, and does not take into account any wider economic benefits to society;

- the absence of data/research to support quantitative analysis of a number of other indicators as described in the diagram at the end of chapter 7 eg labour market productivity gains; and

- no consideration of the value of non-quantifiable benefits as shown on the same diagram.

Indeed, we suggest that the benefits to society calculated above are likely to represent a very small subset of the likely total benefit to society of investment in social housing. Given the significance of the benefits capable of quantification when better data becomes available it is likely that the gap between the marginal costs and quantifiable marginal benefits could close significantly.

The discussion below describes the approach taken to measuring these three benefits, and the results generated. Refer also to Appendix D for a detailed description of the model which has a 15 year timeframe.

Quantitative Benefit 1: Improved Health Outcomes

Health outcomes have been measured only by examining the findings of research carried out by the Otago School of Medicine and others which showed:

- a 37% reduction in hospitalisations in households which participated in the Healthy Housing programme (which emphasises over-crowding reduction, modernisation, insulation, ventilation and heating);

---

[13] Source: 'Estimating the Costs of Crime in New Zealand 2003/2004' Equivalent annual cost based on the average cost per known crime that is recorded and involves police and court time (excluding sexual offences, fraud and serious traffic offences).

- a 19% reduction in hospitalisations over a four year period for Housing New Zealand tenants compared against prospective tenants on the Housing New Zealand waiting lists. These reductions have then been multiplied by the average cost per hospital admission[14] to obtain an equivalent annual fiscal benefit per tenant of $130 for a new house (which is assumed to benefit from both Base and Supplementary benefits) and $100 for a modernised/upgraded house per tenant (which is assumed to benefit only from the Healthy Housing evaluation benefit).

Note: $130 equivalent annual benefit is calculated as a reduction in cost per tenant. This is achieved by multiplying the average preventable cost of hospitalisation by the improvement in hospitalisation rate (due to both a new house and Healthy Housing). This benefit is ramped up over four years (at an additional 25% each year) to reach full benefit realisation in year five and thereafter. The present value of these reduced costs/benefit is then annualised over the 15 year term of the model.

$100 equivalent annual benefit is calculated as above, but the improvement in hospitalisation rate is calculated using only the improvement attributable to Healthy Housing, and there is no ramp up in the first four years.

The inputs for the above calculations are as follows:

- The average preventable hospitalisation cost is assumed to be $2,500.

- The improved hospitalisation rate due to a new house is the difference between waiting list hospitalisation (128.5/1000 people) and tenant hospitalisation (104.2/1000 tenants), resulting in the improved rate being 24.3/1000 tenants (19%).

- The improved hospitalisation rate due to Healthy Housing is the difference between tenant hospitalisation (104.2/1000 tenants) and the hospitalisation rate for tenants after the Healthy Housing program (65.7/1000 tenants), resulting in the improved rate being 38.5/1000 tenants (37%).

- The discount rate used to calculate the present value benefit is 7.5% per annum.

Limitations relating to the health benefit results are as follows:

- The NZIER cost analysis distinguishes between different household types (size of property, family characteristics e.g. single parent with children). For this analysis, it has been necessary to make the simplifying assumption that the health benefit per person calculated by the studies above can be applied to each household member on a straight line one-for-one basis. This may not be a valid assumption for all household types and compositions – particularly where there is evidence of over-crowding.

- The calculation of benefits was primarily based on the evaluation of Healthy Housing, which assessed only the average decrease in hospitalisations following implementation of the programme to a particular set of state houses. Since the public healthcare costs associated with hospitalisations is a small subset of the total cost to society of poor health, it is likely that the health benefits to society are much bigger than shown here.

---

[14] Per email Gary Jackson Counties Manakau DHB 27/8/07 the standard NZ price for a hospital discharges, for the purposes of DHBs paying each other for Inter-district flows is $3740 for 2007/08

- There is also evidence of reduced rates of hospitalisations for state house tenants compared against those on waiting lists for state houses (although both groups have higher rates than the general population[15]). The data from the Healthy Housing evaluation has been extrapolated to provide an estimation of the health benefits of providing an additional house which moves a family off the waiting list.

- This combined data has been hypothesised to provide a reasonable proxy for the value of a new state house or non-government social house in terms of health benefits to society on the basis that a new house will be constructed to the same standards as a house which has been modified following participation in Healthy Housing.

- Although there may well be some health benefits associated with home ownership, there is no quantitative or qualitative research to provide evidence of improved "wellbeing" arising from home ownership.

- This analysis is only useful when considering the average benefit of investment in an additional property. It does not consider whether the marginal benefit of more and more investment declines to a point where there is no further marginal benefit.

Context for assessing the health benefits of each intervention

1.   State Housing

The following extracts from the NZ Housing Strategy highlight the importance of providing good quality housing in improving health outcomes:

> *"Adequate housing is fundamental to the health and well-being of families and communities. For this reason all New Zealanders must have access to quality, affordable housing.*
>
> *The long-term social and economic costs of poor quality housing mean that investing in good quality housing has wider benefits, such as better health outcomes. There are benefits to society and the national economy if homeowners, tenants and lenders can rely on good quality, well-maintained and durable housing.*
>
> *One response is the Healthy Housing Programme, a partnership between Housing New Zealand Corporation and District Health Boards to reduce risk of disease through housing modifications and facilitating referrals to health and social service providers. Initiatives such as the Rural Housing Programme, a Housing New Zealand Corporation programme to eliminate substandard housing in parts of New Zealand, are also aimed at addressing serious deficiencies in some existing housing.*
>
> *Ongoing modernisation of state housing will ensure the state housing stock meets present and future tenants' needs. This will be achieved by identifying, prioritising and undertaking work to improve the health and safety, amenity, functionality and efficiency of existing stock to appropriate defined standards."*

---

[15] "Towards an evaluation of the Healthy Housing programme using RENTEL data"

Housing New Zealand's latest Asset Management Strategy outlines the following relevant facts:

- Housing New Zealand's proposed modernisation programme[16] incorporates modernisation of approximately 43,000 units built before 1980 over the next 15 years.

- The total cost of modernising all of these units is estimated at $1.4 billion ($2007).

- Of this, the estimated cost of modernising housing specifically to improve health and safety and heating is $0.3 billion, with the remainder largely relating to improving amenity/utility levels.

- Over the next three years a total budget for modernisation has been established of $198 million.

- Of this $21 million ($7 million p.a.) has been appropriated from the Crown specifically to fund investment in Healthy Housing across a total of 2,500 units. The remainder of the modernisation budget is not appropriated and will therefore be funded internally.

- In addition, Housing New Zealand is projected to make a net acquisition (through both purchase and leasing) of over 1,500 units (3,400 acquired less 1,800 divested). These acquisitions will meet Healthy Housing agreed quality standards (however note discussion below on standards).

2. Supporting Non-Government Social Housing through HIF

Both the NZ Housing Strategy and the Asset Management Strategy focus on ways in which Housing New Zealand can improve health outcomes through investment in state housing. However investment in non-government social housing through HIF is equally effective in delivering health outcomes because clear guidelines are laid down as part of the conditions of investment.

Aspects of Healthy Housing such as working collaboratively with other government agencies may be modified to meet the circumstances but there is no reason why local authorities should not be able to work closely with central Government. Further, social housing provided by charitable trusts and other non-government organisations, may have added potential for a targeted focus on specific health outcomes such as mental health.

Arguably there is some potential for dilution of benefits due to dilution of control over investment as compared to direct investment in state housing, however we have not applied a factor to allow for this as any such adjustment would be highly judgmental.

3. Facilitating Home Ownership

No health benefits have been quantified in respect of home ownership facilitation interventions as the relationship is likely to be indirect at best, and no research has been carried out to demonstrate benefits. However it is arguable that the health benefits observed in relation to security of tenure by state housing tenants compared against applicants should also be observed for first home-owners. The difficulty is that there is no ability to control the standard of housing purchased by home owners.

---

[16] The Modernisation Policy Statement agreed to by the Ministers of Finance and Housing in 2005 is as follows:
"Housing New Zealand will modernise existing stock for long term renting to ensure that it meets today's, and identified future, customer needs. This is to be achieved by identifying, prioritising and undertaking works that improve the health and safety, amenity and functionality and efficiency of existing stock to appropriately defined standards to the extent that other government priorities and fiscal constraints allow."

Note re housing quality standards

At the current time there does not exist in New Zealand a commonly agreed set of standards which constitute a minimal level of residential building amenity to ensure a satisfactory standard of health for a given household. This is a current focus for the Department of Building and Housing.

The following standards can be considered in this context:

- The NZ Building Code.

- The Canadian National Occupancy Standard (relates to measures of overcrowding - refer further information contained at the end of Appendix B).

- Housing New Zealand's "Decent Housing" guidelines.

- BRANZ Ltd – results of the New Zealand house condition survey.

- Housing New Zealand and Ministry of Health "Healthy Housing" programme guidelines.

Whilst all of the above represent useful guidance, the absence of a definitive agreed standard leaves room for significant judgments to be made and therefore potential for significant variation in the level of benefits which may be achieved.

Overall, however, this benefit category appears to have the greatest level of evidence to support a correlation between interventions and quantifiable benefits, and therefore probably the greatest level of justification for investment. In any event, it would be reasonable to assume that investment to deliver health benefits would be likely to deliver a range of other benefits since there is likely to be significant areas of overlap.

Appendix C describes the approach taken for the purpose of this paper to measuring potential marginal health benefits from investment in housing interventions.

Quantitative Benefit 2: Education Outcomes

With the fiscal benefit to society estimated at 19.5% (being the lowest marginal tax rate) and an average child age of 10 years old this results in an equivalent annual cash flow benefit of $517 for two children ($258 per child) for the 15 years following the intervention (refer Appendix D for further details of the assumptions included in the model). Analysis of Statistics NZ data supports an increased average annual wage for those who have achieved an NCEA Level 2 qualification rather than an NCEA Level 1 qualification of $2,080.

The calculation of the benefit above relies on the following assumptions:

- Given a set of circumstances (refer discussion below "Providing context for assessing the education benefits of each intervention") it may be possible to provide housing interventions which would be likely to increase the average level of educational attainment of children living in a state house from the equivalent of NCEA level 1 to NCEA level 2.

- There is a statistical correlation between the highest level of educational attainment and the average weekly earnings of an individual over their lifetime.

- The analysis assumes that there may be benefits accruing to a particular target population; this population is likely to include those already living in a state house or houses provided by the non-government social housing, and those on waiting lists for such houses.

- Society benefits from this higher level of productivity. A conservative estimate of this benefit is the present value of the fiscal benefit based on 19.5% (the lowest marginal tax rate) of the enhanced level of earnings over the 15 years following the intervention. This assumes that an individual who earns more and therefore pays more taxes, does not consume more taxpayer funded services as a result of their higher income. This is considered a reasonable assumption, and moreover it is likely that benefits to society are greater than the fiscal benefit alone.

Limitations relating to those results are therefore as follows:

- There is no quantitative research evidence to support the hypothesis that housing interventions can, by themselves, improve levels of educational attainment. The Healthy Housing outcomes evaluation indicates that there may be some educational benefits from housing interventions. Housing New Zealand and the Ministry of Education are currently working.

- By extension, there is currently no data available to support the extent to which housing interventions might enhance educational attainment (if any). Enhancement from NCEA level 1 to level 2 has been selected for the purpose of this hypothetical analysis on the basis that it seems reasonable to assume that housing interventions may assist teenagers as a key target group.

- The NZIER cost analysis distinguishes between different household types (size of property, family characteristics e.g. single parent with children). As for the health benefit analysis this was not possible for the education benefit analysis.

- As the NZIER cost analysis looked only at the cost of providing an additional property (as opposed to investment in existing properties) this analysis assumes a level of increased educational attainment benefit associated with each such additional property. The hypotheses therefore is that new properties will be developed in such a way as to improve the likelihood of improved educational attainment.

- It is reasonable to assume that benefits to society of increased educational attainment extend beyond the fiscal benefits of higher income levels. Work carried out in the 1980s at the time tertiary student fees were introduced suggested that 75 percent of the benefit of improved education is a benefit to society.

- Although there may well be some education benefits associated with home ownership, there is no quantitative or qualitative evidence that homeownership may be associated with increased home-life stability which may lead to improved educational outcomes.

- Again, this analysis only considers the possible average benefit to society from increased educational attainment through of investment in an additional property. It does not consider whether the marginal benefit of increasing investment declines to a point where there is no further marginal benefit.

Context for assessing the education benefits of each intervention

1.   State Housing

The New Zealand Housing Strategy does not directly target educational outcomes. However the following statement is likely to hold equally true for education outcomes as for health:

> *The long-term social and economic costs of poor quality housing mean that investing in good quality housing has wider benefits, such as better [health] outcomes. There are benefits to society and the national economy if homeowners, tenants and lenders can rely on good quality, well-maintained and durable housing.*

The available research does not demonstrate an empirical and direct correlation between the standard of housing and education outcomes. The statistics show that children in low decile locations are less likely to gain higher educational qualifications. Some low decile locations include high concentrations of State housing. Housing New Zealand is targeting these areas to improve house quality and linkages of households to the Community using Healthy Housing and Community Renewal. Of course there will be many contributing factors to this relationship, but the following housing related attributes may have some bearing:

- Short length of tenancy tenure – families moving repeatedly seeking affordable accommodation or accommodation near to employment. It is noted, however, that Private Rental is shorter on average than social housing;

- Overcrowding, limiting a child's ability to study in an appropriate environment;

- Illness (refer above) resulting in absences from school;

- Lack of privacy and amenity, e.g. small bedrooms – limited appropriate places for study; and

- A range of factors leading to truancy – for example, perceptions of insecurity, high levels of fear and gang related activities in a community.

To the extent that any or all of the above hold true then the following interventions may provide benefits in terms of improved educational achievement:

- Modernisation programmes for social housing to improve amenity levels;

- Healthy Housing Programme which targets the needs of a particular household using a multi-agency approach with wider objectives than simply improving health; and

- Provision of additional housing units which provides additional families currently on waiting lists with the possibility of enhanced security of tenure.

2.   Supporting Non-Government Social Housing through HIF

As for health benefits, it appears likely that investment in non-government social housing through HIF could be equally effective in delivering education outcomes. Social housing provided by charitable trusts and other non-government social housing providers, may have added potential for a targeted focus on education outcomes to specific target groups such as Maori.

There have long been debates regarding the benefit to society (public good vs private good benefits) arising from education, particularly in relation to tertiary education. There is no debate that compulsory education provides substantial benefits to society, and the focus of social housing interventions would therefore be expected to be on increasing the number of children living in social housing who gain secondary qualifications such as NCEA levels 1-3.

The wider benefit to society in terms of productivity gains is hard to measure, however a possible proxy is the fiscal benefit (increased tax revenue) from the increased lifetime earning potential of children who gain, say NCEA level 2 as opposed to NCEA level 1.

3.   Home Ownership Facilitation

No education benefits have been quantified in respect of homeownership facilitation. It is again arguable that the educational achievement benefits hypothesised in relation to security of tenure by state housing tenants compared against applicants should also be observed for first home-owners.

Appendix C describes in more detail the approach taken for the purpose of this paper to measuring potential average educational achievement benefits from investment in housing interventions.

Quantitative Benefit 3: Crime Outcomes

Hypothetically, if housing interventions prevented a number of personal and property related crimes, then it may be possible to demonstrate a linkage to reduced costs to Government of dealing with these crimes. The average cost per known crime that is recorded and involves police and court time (excluding sexual offences, fraud and serious traffic offences) is $3,457[17].

The calculation of the benefit to society would rely on the following assumptions:
- Given a set of circumstances (refer discussion below "Context for assessing the crime reduction benefits of each intervention") it may be possible to provide housing interventions which would be likely to reduce the average crime rates reported in areas with high concentrations of state or non-government provided social housing. This reduction in crime rate could be quantified.

- There is a known average cost in terms of cost to the taxpayer associated with each reported crime, these costs include police time, courts-related costs and imprisonment costs where applicable. In general these costs tend to increase with the seriousness of the crime (only 9% of convicted criminals receive prison sentences).

- The analysis assumes that there may be benefits accruing to a particular target population. This population is likely to include those already living in state house or houses provided by the non-government social housing, and those on waiting lists for such houses and living in areas with high crime rates.

Limitations relating to the results would therefore be as follows:
- There is no research to support the hypothesis that housing interventions can, by themselves, reduce crime rates (although, as for education, evaluation of programmes such as Community Renewal have indicated an impact on tenants and local welfare groups of improved levels of personal safety and property security).

---

[17] Source: 'Estimating the Costs of Crime in New Zealand 2003/2004'

- By extension, there is no empirical evidence to support the extent to which housing interventions might impact on crime rates – e.g. per head of population.

- The NZIER cost analysis distinguishes between different household types (size of property, family characteristics e.g. single parent with children). As for the health benefit analysis this was not possible for the crime reduction benefit analysis.

- As the NZIER cost analysis looked only at the cost of providing an additional property (as opposed to investment in existing properties) this analysis assumes a level of crime reduction benefit associated with each such additional property. The hypotheses therefore is that new properties will be developed in such a way as to minimise known causes of crime in existing areas of state housing or non-government social housing.

- Community Renewal uses Crime Prevention TED to develop new properties which is expected to reduce crime, although, as for education, tenants, residents and local welfare groups indicated that programmes such as Community Renewal have an impact on perceived levels of personal safety and property security.

- It is reasonable to assume that benefits to society of reduced crime levels extend beyond the costs to the taxpayer of responding to crime notifications.

- Although there may well be some crime reduction benefits associated no victimisation research has been undertaken to support this hypotheses.

- Again, this analysis only considers the possible average benefit to society from reduced levels of crime in areas of high concentration of state houses and non-government social housing through investment in an additional property. It does not consider whether or how the marginal benefit of increased investment declines to a point where there is no further marginal benefit.

Context for assessing the crime reduction benefits of each intervention

1.   State Housing

The New Zealand Housing Strategy does not directly target crime reduction as a key objective and there is no research available which demonstrates a direct correlation between the standard of housing and levels of crime. However crime statistics show that there tend to be more crimes committed in low decile locations. Again, there will be many contributing factors to this relationship, but the following housing related attributes may have some bearing:

- Lack of appropriate security and safety measures in and around properties – e.g. secure locks, security lighting, dark/unobserved corners;

- Short length of tenancy tenure and lack of community attachment – families moving repeatedly seeking affordable accommodation or accommodation near to employment;

- Lack of affordable accommodation leading to crimes being committed to help "make ends meet"; and

- High levels of fear and gang related activities in a community.

To the extent that any or all of the above hold true then the following interventions may provide benefits in terms of improved crime reduction:

- Modernisation programmes for social housing to improve security of individual properties;

- Community renewal programmes looking at measures to improve community well-being in a range of areas – including eliminating dark corners and improving lighting;

- Provision of additional housing units which provides additional families currently on waiting lists with the possibility of enhanced security of tenure and greater community attachment; and

- Provision of additional state housing units and associated Income-related Rent, which is more financially beneficial to tenants in most cases than the Accommodation Supplement.

The benefits to society of reduced crime are obvious but in many ways unquantifiable. The direct quantifiable benefit is derived from the costs to Government from managing crimes. This includes police time and resources and also Courts and Corrections services costs in some cases. Further research could also examine the insurance costs relating to crimes (to property in particular).

2.   Supporting Non-Government Social Housing through HIF

As for health benefits, it appears likely that investment in non-government social housing through HIF could be equally effective in delivering crime reduction outcomes so long as clear guidelines were laid down as part of the conditions of investment. Social housing provided by charitable trusts and other non-government social housing providers, may have added potential for a targeted focus on reducing crime for specific target groups such as teens.

3.   Home Ownership Facilitation

No crime reduction benefits have been quantified in respect of homeownership facilitation. It is again arguable that home-owners are more likely to purchase in higher decile areas of mixed housing where crime levels are lower although this is not necessarily true for first home buyers. The benefit in this case, however, is more directly felt by the home-owner rather than society.

Appendix C describes the approach taken for the purpose of this paper to measuring potential marginal crime reduction benefits from investment in housing interventions.

Conclusion

There is limited research and related data to enable an accurate quantification of the benefits accruing from the different interventions in relation to improved health, education and crime outcomes. It is reasonable to assume that access to adequate housing will facilitate better outcomes in relation to each of these measures. Further, it is reasonable to assume that the benefits will be similar across the interventions. It is also possible that marginal benefits accrue from non-government social housing or home ownership facilitation over and above that arising from direct Housing New Zealand provision. The research and data is not available to enable these marginal benefits to be quantified.

10. Qualitative Benefits

As discussed above, the measurable quantitative benefits will at best represent a subset of the wider benefits to society from housing interventions. Housing New Zealand document Benefits of Housing Assistance by Intervention: Literature Review" contains a full list of potential benefits identified by Housing New Zealand as arising from investment in social housing interventions. In summary, key qualitative benefits are as follows (refer also Figure 5 in Chapter 7):

Table 7 Qualitative Benefits

Intervention	Benefits to Tenants	Potential Benefit to Society
Provision of State Housing/IRR and Investment in Modernisation, Healthy Housing, Community Renewal Programmes	• Perception of Housing New Zealand as a good landlord. • Properties well maintained. • Security of tenure, "good" landlord. • Cheaper rentals than in private or non-government social housing sector, even with AS. Not required to pay bond or rent in advance. • Provision of shelter to those in need – particularly those who would find it hard to rent in the private sector. • Safety net – able to provide short notice accommodation to those fleeing domestic violence etc. • Healthier living environment, including less overcrowding. • Increased mobility and independence for residents with disabilities. • Lower stress levels. • Facilitated community involvement/attachment – including access to support services for high need tenants (e.g. refugees). • Improved safety and security – less likely to be a victim of crime. • Improved amenity and comfort levels (e.g. modern kitchens) leading to greater sense of wellbeing. • Fair selection process – less likely to experience discrimination. • Better co-ordination between health and social services agencies.	• Healthier population, lower rates of certain illnesses (e.g. asthma), fewer hospital admissions. • Greater labour market participation. • Improved levels of educational participation and achievement • Lower levels of crime. • Minimal levels of homelessness. • Safety net for the most vulnerable members of society • Meeting needs of disabled. • Less opportunity for racial or other discrimination with respect to housing provision. • Enhanced family well-being. • Reduced numbers of people "detached" from society – not accessing appropriate social services and not participating in their communities.
Investment in non-government social housing provision through HIF/LGF/AS	• Assuming loans are tied to both quantity and quality criteria for supply of social housing then as above, except in respect of cheaper rentals. • However AS does increase net income levels. • Greater choice over where to live. • Projects tend to provide tailored local housing provision to specific client groups.	• As above. • Tends to promote greater levels of racial and economic diversity in locations with lower concentrations of social housing. • Enables leveraging off existing local non-government investment in social housing. • Allows for direct involvement of community groups, e.g. Maori, Pacific Island.

Intervention	Benefits to Tenants	Potential Benefit to Society
		• Encourages innovation by non-government social housing and strengthens local authority commitment to social housing.
Facilitation of first home ownership	• Assisted into home ownership, which provides: 　○ Greater security of tenure; 　○ Feeling of wellbeing, increased self-esteem, pride and achievement; 　○ Greater choice of location of residence – proximity to family, jobs etc; 　○ Improved knowledge about housing buying process and implications, including need to budget; 　○ A choice of quality of house, eg ability to carry out "DIY" improvements to enhance security, amenity, healthiness – motivated to improve value; and 　○ Feeling of increased financial security.	• Encourages sustainable labour market participation. • Healthier population. • Increase in value of housing stock. • Population more knowledgeable about home ownership options. • Enhances family stability and improves the connections families have with the communities and continuity of education. • Provides a buffer against poverty.

Conclusion

As with our discussion in Section 9 in relation to quantifiable benefits the majority of qualitative benefits will be common across interventions provided each intervention delivers an equivalent standard of accommodation. For these benefits to be quantified with any accuracy it will be necessary to link each to a benefit that can be quantified. For example, linking the increase in wealth arising from home ownership to improved health, education, and crime outcomes. Without this link and the related research and underlying data it is not possible to:

(i)   convert these qualitative benefits to quantifiable benefits; and

(ii)   establish the marginal benefit associated with non-government social housing and home ownership interventions relative to direct provision by Housing New Zealand.

Following discussions with Housing New Zealand, we suggest the following priority order of preference for outcomes at a society level:

1. Ensuring all New Zealanders have shelter.

2. Providing housing which meets a minimum level of healthiness.

3. Meeting the needs of vulnerable members of the community, such as the homeless and disabled.

4. Improving social connectedness and in particular improving education and employment outcomes by those living in communities dominated by social housing.

5. Reducing levels of crime experienced by those living in communities dominated by low income housing.

6. Improving family stability, in particular through improving levels of home ownership.

This is only an indicative prioritisation. A more rigorous process would involve considering and rating society's preference for (for example) healthy children and older people as compared against providing low income housing in areas with high latent unmet labour market shortages. This may require a revealed preference survey or focus group approach.

However, as the diagram in Chapter 7 shows, there are strong linkages between quantifiable and non-quantifiable benefits and it may therefore be appropriate to first investigate the extent to which additional research can assist in quantifying a range of benefits, before attempting to place weightings on qualitative benefits since these will always be inherently subjective.

Further detailed research into the linkages between housing interventions and the main benefits discussed in this report is essential if Housing New Zealand wishes to better understand the effectiveness of housing interventions in terms of quantifiable benefits and consequently to better understand where the next marginal dollar of investment would most effectively be applied.

A key early step is for Housing New Zealand and related agencies (Department of Building and Housing, in particular) to reach agreement as to an agreed standard for "good quality" housing in New Zealand. This will enable a benchmark to be set so that research can be undertaken into the benefits of providing housing which meets this standard. Without such a benchmark, any research undertaken will be ad hoc and inconsistent in its conclusions.

11. Conclusions and Recommendations

This report has concentrated on the benefits to society of the various housing interventions that Housing New Zealand provides to those New Zealanders who are in need. When considered intuitively, there are many benefits that the housing interventions provide for. These include:

- Provision of appropriate shelter to vulnerable members of the community;

- Improved health through reduced overcrowding and healthier, more energy efficient homes;

- Improved education attainment and achievement;

- Improved access to employment opportunities;

- Reduced levels of crime and vandalism in areas with high concentrations of social housing;

- Improved levels of community connectedness;

- Lower levels of poverty; and

- Improved sense of family stability and wellbeing.

Further Assessment Required

Generally collection of further data would be helpful in analysing the effectiveness of the interventions carried out by Housing New Zealand:

- Current levels of homelessness in New Zealand (including those living a transient life, moving frequently);

- A complete picture of waiting lists across the non-government social housing sector as well as for state housing, including measures of need;

- Levels of over-crowding across New Zealand households;

- Numbers of households living in unhealthy housing other than through over-crowding; and

- Numbers of "vulnerable" households living in unsuitable accommodation, including those with special needs, illness and injury.

The following information regarding the main benefits discussed in this report would also be helpful in analysing the effectiveness of housing interventions.

Potential further research: health benefits

Set out below are areas of potential further research which could assist with the development of better specified cost benefit analysis. We note to assist with the evaluation of the relative benefits of different types of intervention it will be necessary to research not only the link between adequate housing and the potential benefits identified, but also the link between how the housing is delivered and the benefits identified.

Potential further research: health benefits

The Wellington School of Medicine report by Michael Baker and the subsequent report by Michael Baker entitled "Social housing may markedly reduce hospitalisations: Results from a large cohort study" gives the best empirical analysis of the health benefits to society of housing interventions. This data concentrates on acute hospital admissions and potentially avoidable hospitalisations. This research could potentially be extended to examine other measures of healthiness such as the rate of doctor visits.

It would also be very helpful if the data could be segmented to allow for an enhanced understanding of the level of health benefits accruing to different household types and the reasons behind the relationships – for example, do larger houses (3br+) tend to yield higher benefits per household, reflecting the increased number of people living in the house or is in fact the relationship reversed so that smaller house (<3br) tend to have higher levels of overcrowding leading to more intense health problems.

Other possible areas of research include the health benefits of home ownership for low income households and the relationship between level of income and healthiness for tenants of state houses and non-government social housing.

There is currently no common standard for existing houses in New Zealand to ensure that a safe level of health can be maintained.   If a standard could be agreed upon it would improve the comparisons available between those who live in an "unhealthy" house to those who live in a healthy house and the quantifiable benefits which could be accrued by improving the unhealthy houses.

Potential further research: improved educational achievement

There is limited research on the connection between housing standards and the value of particular housing interventions and the level of educational achievement by tenants, particularly children and teenagers.

Further research into the connection (if any) between factors such as tenancy stability, overcrowding and lack of privacy, other housing factors causing illness, and measures of educational participation such as truancy levels would allow for greatly enhanced understanding of the linkages between educational achievement and social housing interventions.

This data could be further segmented to examine different household types and compositions to understand how benefits can be maximised and the true extent of potentially realisable benefits.

Potential further research: reduced levels of crime and vandalism

One of the aims of the Community Renewal is to reduce crime and vandalism. The Housing New Zealand Community Renewal Programme Evaluation (March 2006) showed that many tenants in the six areas involved in Community Renewal felt safer and felt there was less crime. An empirical analysis of the crime rates in these areas before and after Community Renewal was started would provide more information on the extent that Community Renewal was reducing crime.

Further studies on the level of security and safety measures in state housing areas, the length of tenancy tenures, the level of crimes committed due to a shortage of money and the level of gang membership compared to the average population could provide further assistance.

Potential further research: increased levels of employment

The majority of social housing tenants and applicants are currently on a benefit. However, analysis of the proportion of tenants who enter the workforce after becoming a tenant would be useful information. While many social housing applicants are on the waiting list due to their low income, there is a significant number who are on the list due to other special needs. This could be due to illness or disability. If these applicant's housing standards improve sufficiently there is the possibility that their quality of life will improve also to allow them to re-enter the workforce. The report "Finding a Place to Live: A qualitative exploration of the housing choices of low and middle income New Zealanders" (February 2006) did not include employment benefits in the research.

Potential further research: facilitating home ownership

There has been no research carried out to ascertain any health benefits from ownership of a home, compared to renting. There is also the possibility that those who can only afford a cheap house will have lower health benefits than living in a state house that meets quality standards. In terms of education, home ownership would provide greater security of tenure. Any studies completed on lengths of tenure and school achievement would therefore be helpful. In terms of crime levels, further study on the amount of crime levels in the areas where people buy their houses compared to where they were living prior to purchasing a house could be helpful.

Implementing a benefit realisation framework

It is generally acknowledged to be good practice when implementing a new or additional intervention requiring additional investment to concurrently put in place a framework to allow future analysis of benefit realisation. This requires the following:

(i)   *At the outset*, research and agree baselines, e.g. current levels of hospitalisations for social housing tenants in a particular area;

(ii)   Set targets based on those baselines for specific initiatives;

(iii)   Agree Key Performance Indicators (KPIs) that are meaningful and measurable – these should focus on the targets but also measure other factors likely to impact on the targets;

(iv)   Establish KPI to monitor process and governance structure; and

(v)   Foster accountability and on-going ownership around benefit realisation.

To ensure that all those involved in the project understand what is expected, it is important also to:

(i)   set clear targets and measures, which may also be incorporated into personal career development plans;

(ii)   communicate intervention logic to staff and clarify spheres of control;

(iii)   develop an appropriate tracking system to measure the results; and

(iv)   develop processes to review and resolve issues.

APPENDICES

Appendix A: Summary of Evidence /Research

New Zealand Living Standards 2004

This study was completed based on the use of the ELSI scale and was used as a comparison to the 2000 Living Standards survey. The ELSI scale includes a number of items which provide the basis for deciding the living standards of each person. The type of items include the type of meat, fruit and vegetables purchased, whether a person can afford a trip to the doctor, pay for phone and internet, and participate socially by giving presents to family and friends, have a night out every second week and invite family and friends over for dinner. It also includes a person's self assessment of their standard of living, adequacy of income and satisfaction with standard of living. The ELSI scale is based on seven levels, with the labels ranging from level 1 being "severe hardship", level 4 being a "fairly comfortable" living standard and level 7 being a "very good" living standard.

The overall living standards of the total population show that 76% of the population have living standards that are "comfortable" or "good", or levels 5 and 6 on the ELSI scale. Overall, living standards in 2004 are approximately the same as in 2000, with approximately the same mean ELSI score. However, inequalities have increased since 2000, with those people on low living standards, including sole parents, those reliant on income-tested benefits and large families having lower living standards in 2004 than in 2000. Further, the positions of various subsets of people have remained generally the same in 2004 as in 2000. This shows that children, Maori, and Pacific people have lower living standards than the population as a whole, while older people, the self-employed and couples without children have higher standards.

Housing New Zealand Corporation ("Housing New Zealand") tenants have a lower mean living standard in 2004 compared to 2000. There has also been a large increase in those Housing New Zealand tenants who are at the lowest ELSI level, indicating severe hardship. There were 39% of tenants in level 1 in 2004, compared to 20% in 2000. This is due largely to the change in Government policy between the two studies, changing state housing from a market-related rent structure to that of the current income-related rent structure. Only 53% of Housing New Zealand tenants at June 2004 were also tenants at June 2000[18]. This study shows that while many of the tenants have some financial pressures eased by the IRR scheme, there are still a large percentage of tenants who are still in serious financial difficulty.

---

[18] *New Zealand Living Standards 2004*; Ministry of Social Development; 2006; Page 73

Housing, Crowding and Health Study[19]

This report covers analysis of a cohort of Housing New Zealand applicants[20] and tenants over a 29 month period from February 2003 to June 2005. The key aims of the study were:

- to assess the relationship between levels of household crowding and rates of hospitalisation for infectious diseases in a cohort of New Zealand households;

- to assess the impact of a reduction in household crowding on the risk of infectious disease in the cohort of households; and

- to assess the impact of household crowding and environmental tobacco smoke on respiratory diseases and other health outcomes.

The information regarding overcrowding from the cohort of people came from Housing New Zealand through their needs assessment ("NA") interviews which occur prior to an applicant being confirmed on the waiting list and then through the IRR assessment which occurs a year after the tenancy begins to ensure that the tenants are still in need of IRR.

Applicant Characteristics

The majority of applicants (42.7%) were single with children. Approximately a quarter of the other applicants were single and over 25. Couples made up 29.1% of the applications[21]. The applicants mean income was $270 and the median $245.30. The mean household size for applicants is 4.0, with the mean number of bedrooms for the applicants being 2.4[22]. One measure for overcrowding used is a value of 2 or more people per household. The study completed two tests, one incorporating non-applicants currently living with applicants and one which looked at applicants alone and the bedrooms they had available to them. In the first, 37% of people were living in crowded conditions of two or more people per bedroom. The second, more relevant test showed 34% of the applicants were living in crowded conditions[23].

The average duration of all current housing applicants as at June 2005 showed that the applicants had been waiting for a mean of 50 weeks. However, the high priority applicants ranked as A or B had been waiting for 41 weeks. The number of households ranked as either A or B made up approximately 41% of the applicants[24]. The high priority applicants as at June 2005 were generally younger than the moderate priority (ranking C or D) applicants, had an over-weighting of Maori people and had a greater proportion of single parents. The high priority applicants also had lower incomes on average. All of the above characteristics are intuitively representative of people showing greater need.

---

[19] *Housing, Crowding and Health Study: Characteristics of cohort members and selected hospitalisation events, February 2003 – June 2005*; Michael Baker and Jane Zhang; Wellington School of Medicine & Health Sciences; Draft Report October 2005.

[20] Those confirmed on the Housing New Zealand waiting list.

[21] *Housing, Crowding and Health Study: Characteristics of cohort members and selected hospitalisation events, February 2003 to June 2005*; Michael Baker and Jane Zhang; Wellington School of Medicine & Health Sciences; Draft Report October 2005; Page 45

[22] As for note 20; Page 48

[23] As for note 20; Page 52

[24] As for note 20; Page 59

Tenant Characteristics

The structure of the tenant households shows that the majority of people are single. The largest group is those who are single with no children and 25 or over, with 36.7% of all tenants. There is also a significant amount of single people with children, with 35.5% of the total tenants[25]. The mean income for tenants was $305.55 per week with the median being $262.52 per week. The majority of tenant households have at least one member receiving a benefit. The number in June 2005 who weren't receiving a benefit was 5,412 or approximately 9% of all tenant households. Approximately 72% of households had one member receiving a benefit.

The mean number of bedrooms of the social houses as at June 2005 was 2.5 and the median was 3. The mean number of people per bedroom is 1.2 and the median is 1.0, and 15.2% of the households in state housing are considered overcrowded with over 2 people per bedroom. This compares with 34% of applicants being in overcrowded households. The majority (61.6%) of applicants who become tenants decrease their level of household crowding, and the decrease is significant[26].

The mean length of tenancy for those in state housing at June 2005 was 387 weeks, with the median being 245.9 weeks. Approximately 85% of tenants have spent longer than a year in their current accommodation.

Table 8 Household Crowding

Characteristic	Housing Applicants	Housing tenants	NZ Population[1]
Sharing with another family %	37.0		2.2
Household size			
Average number of people in household	4.0	3.2	2.7
Median number of people in household	3	3	2
House size			
Average number of bedrooms	2.4	2.5	3.1
Median number of bedrooms	3	3	3
Crowding Measures			
Average people per bedroom	1.7	1.2	0.9
Short of 1 or more bedrooms %	46.1	23.6	5.1
Short of 2 or more bedrooms %	25.3	7.4	1.2
[1]Statistics New Zealand. *What is the extent of crowding in New Zealand?* Wellington: Statistics New Zealand, 2003 Source: Housing, Crowding and Health Study, Wellington School of Medicine & Health Sciences; Draft Report October 2005; Page 76			

---

[25] As for note 20; Page 62

[26] *Housing, Crowding and Health Study: Characteristics of cohort members and selected hospitalisation events, February 2003 to June 2005*; Michael Baker and Jane Zhang; Wellington School of Medicine & Health Sciences; Draft Report October 2005; Page 118

Flows of Households through Housing New Zealand Processes

The three main flows of Housing New Zealand applicants and tenants during the study period involved:

1. staying as an applicant during the 29 month period (22.8%);

2. an applicant becoming a tenant during the 29 month period (31.4%); and

3. an applicant exiting the waiting list during the 29 month period (34.8%).

Of those applicants housed, as expected the highest proportion of applicants in each class who were housed were A priority (66.3% of the total classified as A were housed) and B priority (40.3%), followed by C (18.7%) and D (11.9%) priority. The highest proportion of applicants who left the waiting list were D (42.1% of all classified as D) and C (41.2%) compared with B (30.8%) and A priority (18.3%).

The reasons for applicants who left was overwhelmingly due to no response to an application review request and could not be contacted after Housing New Zealand attempted to contact through a number of avenues. This made up 72% of all those who left. The other main reason was due to the application being cancelled by the customer (26.7%).

Hospitalisations in Housing Applicants and Tenants

The analysis of hospitalisations is based on the 90% of applicants and tenants who were matched to their National Health Index number (NHI). The study further applied a number of filters to remove those hospital events which were either administrative or did not reflect a disease event. The study also removed a number of 'same day' diagnostic procedures and treatment of chronic conditions, maternity and peri-natal events and disability support service admissions. The table below shows the total number of hospitalisations (1), the total less non hospitalisations and selected conditions (2), and the total less non hospitalisations, selected conditions and non-acute admissions (3).

Table 9 Hospitalisation Rates

	Housing Applicants		Housing Tenants		Other NZ population	
Characteristic	Hosp. No.	Rate[1]	Hosp. No.	Rate[1]	Hosp. No.	Rate[1]
Total (1)	6,580	357.7	44,647	300.0	770,346	215.8
Non hospitalisations and selected conditions (2)	3,519	191.3	28,442	191.1	481,197	134.8
Non hospitalisations, selected conditions and non acute (3)	2,405	130.8	18,919	127.1	299,940	84.0
[1] Rate measured in case per 1 000 population per year Source: Table 9.10, 9.11, 9.12 Housing, Crowding and Health Study; Wellington School of Medicine & Health Sciences; Draft Report October 2005, Pages 95-97						

This data shows that there is significantly higher total hospitalisation exposure for housing applicants and housing tenants in all three levels compared to the rest of the NZ population. However, once non hospitalisations and selected conditions are removed, housing applicants and tenants have a very similar rate of hospitalisation.

The data also shows that housing applicants and tenants in the study had elevated levels for almost every specific disease included in the analysis. However, the difference between housing applicants and housing tenants was not significant apart from the rates of hospitalisation for injuries (burns, poisonings) and mental and behavioural disorders (mood disorders, neurotic and stress related disorders, intentional self harm, mental disorders due to psychoactive substance use)[27].

Important conclusions drawn from this study are that there are high rates of hospitalisation for groups of diseases that are partly preventable (eg infectious disease) which through prevention measures could be reduced. Also, some diseases such as asthma and some injuries have the potential for specific prevention programmes to limit the cause[28].

Research on A and B Confirmed Applicants who Exit from the Waiting List[29]

The research was aimed at better understanding why the people who have high housing need, or the A and B confirmed applicants, leave the waiting list before accommodation is found for them. This research focused on those who exited with reasons "exit no response" (XHN) or "exit customer request" (XAC).

The number of exiters in the period September 2004 to January 2006 ranged from 306 (Dec 2005) to 448 (June 2005). Less people exited during the Christmas, New Year period and more people exited in the winter months.

There are a range of different reasons for applicants exiting the waiting list. Many are exited (between 86% and 50% across 11 different regions within NZ) because Housing New Zealand cannot make contact with them to confirm the ongoing need. Other reasons include issues with available properties. This could be due to the properties being in communities which are seen as unsafe or not desirable (eg star blocks). Some applicants, once finding out what kind of accommodation they are likely to get, are more motivated to find private sector accommodation, whereas some applicants who lack motivation are more likely to stay on the list. Most A and B confirmed exiters were aged between 30-44 years, which is considered to be the most popular age to begin a family and most were living in shared accommodation when they applied for a Housing New Zealand property. A higher proportion of A and B applicants who were requiring one or two bedroom properties exited the waiting list than their proportion on the overall list.

---

[27] *Housing, Crowding and Health Study: Characteristics of cohort members and selected hospitalisation events, February 2003 to June 2005*; Michael Baker and Jane Zhang; Wellington School of Medicine & Health Sciences; Draft Report October 2005; Pages 118-119

[28] *Housing, Crowding and Health Study: Characteristics of cohort members and selected hospitalisation events, February 2003 to June 2005*; Michael Baker and Jane Zhang; Wellington School of Medicine & Health Sciences; Draft Report October 2005; Page 119

[29] *Research on A and B confirmed applicants who exit from the waiting list*; Heather Nunns, Annette Baker and Sherry Carne; Housing New Zealand Corporation, Research and Evaluation Team; May 2006

Many of the applicants who are exited due to no response are likely to end up back on the waiting list. This is called churning, and due to the Housing New Zealand RENTEL database being unable to measure this, the rate of churning is unknown. A manual matching confirmed that 39 of the 447 A and B applicants who left in June 2005 were back on the list in November 2005. This is likely to under represent the true rate of churn.

The Influence of Parental Income on Children's Outcomes[30]

The aim of this report was to go beyond the simple analysis of parental income on their children's health and wellbeing, to separate the effect of income from other variables which do have either a direct or indirect effect on a child. The report reviewed a number of other research completed on children's cognitive test scores, behaviour problems, socio-emotional functioning, mental health, physical health, educational attainment, teenage childbearing and labour market success in early adulthood.

What the report has shown is that higher parental income results in positive results for all of the outcomes. The size of the effect is dependent on many factors. However, in research completed that control for outside family background variables, the effect of parental incomes on children's livelihood is generally small to modest.

For cognitive test scores, lower parental income consistently shows lower cognitive ability. A proportion of this result can be attributed to other factors that cause both low incomes for parents and low test scores for children, including genetic inheritance. In terms of socio-emotional functioning, mental health and behavioural problems, a standard deviation increase in parental income would reduce problems by five to ten percent of a standard deviation at most.

For children's health, the report reviewed only a small amount of studies. The overall conclusion was that on average there was not a large effect on most children's health issues due to the amount of parental income. However this conclusion was qualified due to the small amount of studies and the inherent weaknesses within the studies reviewed, including inadequate measures of income and estimation models that exclude important outside factors. For teenage childbearing, the research has been limited and no firm conclusions were made.

In terms of education, a number of studies have shown that when parental income increases by 10 percent, the average extra schooling achieved by the children ranges from 0.024 to 0.104 years. Estimates of the effect of parental income on high school graduation, university enrolment and graduation are all relatively low. Studies have shown that the effect on high school graduation, when parental incomes are doubled using the poverty ratio, ranges from three percent in one study to 51 percent in another when a control for the child's IQ is used. Another two studies show that the chance of a child dropping out decreases by 12.8 and 13.5 percent. These two studies use considerable more controls, including the child's race and the mother's education. The 51 percent result may be explained by the fact that it is the oldest model used and in the US there is evidence that the effect of parental income has declined.

---

[30] *The Influence of Parental Income on Children's Outcomes*; Susan E. Mayer; Ministry of Social Development, Knowledge Management Group; 2002.

Studies of future economic status for children born into low income households have shown different results, depending on the controls used. When average income is used but no family background controls are used, a 10 percent increase in family income results in an increase in their son's wages of up to six percent. However, when family backgrounds are taken into account, the result is more uncertain.

Overall, each outcome is not large in itself but the cumulative effect of all the above factors means parental income can result in a serious effect on a child's upbringing and success in the world.

The Healthy Housing Programme: Report of the Outcomes Evaluation (year two)[31]

The aim of this report is to report on findings from the second year of a three year evaluation on the outcomes of the Healthy Housing programme. The key aims were to identify and review:

- the evidence that the Healthy Housing Programme continues to make a difference in the risk and rate of housing related diseases, conditions and injuries, and improved wellbeing;

- the sustainability of effect of the interventions on the households; and

- any obstacles to the achievement of expected and unexpected outcomes for the Healthy Housing programme[32].

The most common outcomes from interviews with households living in a Healthy Home included:

- increased empowerment;

- a reduction in illnesses such as asthma;

- improved comfort of their home; and

- a general sense of social wellbeing and functioning within the household.

The households interviewed in the evaluation had a range of Healthy Housing solutions. These included extensions and transfers to reduce overcrowding, modernisation, insulation and ventilation. One of the key aims of the Healthy Housing programme was to improve the healthiness of the tenants. Of the interviewed households, there was generally a reduction in the frequency of doctor and hospital contact; with just over half stating they had less contact with health services and 65 percent stating that they had experienced improvements in health. There was also improved motivation for the children in the households to learn and play.

---

[31] *The Healthy Housing Programme: Report of the Outcomes Evaluation (year two)*; Janet Clinton, Faith Mahony, Rebecca Irvine, Chris Bullen and Robin Kearns; Prepared for Housing New Zealand Corporation; September 2006

[32] *The Healthy Housing Programme: Report of the Outcomes Evaluation (year two)*; Janet Clinton, et. al; Prepared for Housing New Zealand Corporation; September; Page12

Towards an evaluation of the Healthy Housing programme using RENTEL data[33]

This report is produced before the second year interviews and was released on 19 January 2006. The report analyses the administrative data held in the RENTEL database for Healthy Housing programme. The report states that Healthy Housing had received $66.4 million capital from the Government over the 5 years from January 2001. A major reason for the establishment of the programme was due to the high levels of infectious diseases that Housing New Zealand tenants were contracting.

Appendix One Healthy Housing Project Thumbnail Cost-Benefit Analysis
Assumptions made and presented to the Board of Housing New Zealand on 25 November 2005:

- Average value of reduced hospital admissions is $75 per year per household.

- Average value of reduced days off school is $12 per year per household.

- Average value of reduced days off work is $54 per year per household.

- Average value energy savings is $72 per year per household.

Social housing may markedly reduce hospitalisations: Results from a large cohort study[34]

The aim of this report was to analyse the level of hospital admissions in Housing New Zealand applicants and tenants relative to the rest of the New Zealand population and to identify the diseases that are potentially preventable and whether social housing has improved the health and wellbeing of the tenants.

The hospitalisation annual age-ethnicity standardised rate for social housing applicants was found to be 128.5/1000, for housing tenants 104.2/1000 and 74.3/1000 for other New Zealanders. When the applicants and tenants were considered together, the rates were also higher for males at 116.2/1000 compared to 81.7/1000 for the rest of the New Zealand population and females at 101.7/1000 compared to 69.3/1000.

The report notes that with the high levels of hospitalisation in the social housing population, combined with the fact that a large percentage of these hospitalisations are potentially preventable means that interventions such as the healthy housing scheme and other modernisation programmes can have a significant effect on the healthiness of the social housing population.

---

[33] *Towards an evaluation of the Healthy Housing Programme using RENTEL data*; Patricia Laing, Alan Bernacchi, Annette Baker and Liz McDonald; Prepared for Housing New Zealand Corporation; January 2006.

[34] *Social housing may markedly reduce hospitalisations: Results from a large cohort study*; Michael Baker, Jane Zhang, Philippa Howden-Chapman, Tony Blakely, and Julian Crane; University of Otago Wellington School of Medicine

The impact of housing improvements on acute hospitalisations at Middlemore[35]

This presentation concentrated on breaking down hospitalisations to show the difference between housing-related potentially avoidable hospitalisations amongst a control population who were not included in the Healthy Housing programme and a case population who were included, over a two year period. Housing-related hospitalisation conditions included:

- Tuberculosis;

- Gastroentiritis ;

- ENT infections;

- Rheumatic fever/heart disease;

- Respiratory infections including pneumonia and bronchiolitis;

- Chronic obstructive respiratory disease ;

- Asthma;

- Cellulitis; and

- Meningococcal infection.

The data showed a 37% fall in acute housing-related hospitalisations in the first year following intervention, which in 2003-2004 equated to 110 acute admissions a year. The expectation is for these benefits to increase over time.

Community Renewal programme evaluation 2005/06 - final[36]

The aim of the Community Renewal programme is to promote change to the economic, social and physical environment in areas with a high deprivation index ranking and where Housing New Zealand has a high concentration of properties[37]. The main goal is "to address social exclusion and foster strong sustainable communities"[38]. The key objectives include:

- Improve and enhance the physical environment and amenities;

- Use the principles of community development to build community leadership and implement sustainable community-led solutions;

- Provide targeted needs-based tenancy and property management services;

- Create links to programmes that enhance resident employment and business growth;

- Provide access to affordable and appropriate community services that respond to changing community needs;

- Improve neighbourhood safety and reduce crime; and

- Build social networks to facilitate residents supporting each other.

---

[35] *The Impact of Housing Improvements on Acute Hospitalisations at Middlemore*; Counties Manukau District Health Board Presentation.
[36] *Community Renewal Programme Evaluation 2005/06, Final*; Dianne Buchan and Kirsty Austin; Prepared for Housing New Zealand Corporation, Research and Evaluation Team; March 2006.
[37] As for note 35, Page 5
[38] As for note 35, Page 5

The report states that the most important factor in ensuring that the community is genuinely involved in renewal activities is community development. This includes:

- Local people being in the best position to identify and priorities activities that are most needed in a renewal area; and

- Community involvement ensuring that there is ownership of the solutions and creates long lasting results.

The easiest area to show quantitative benefits to society through the community renewal programme is through the reduction in crime. While this report does not empirically show a decrease in crime levels, there is anecdotal evidence to support the claim that the community renewal programme does result in improved safety and reduced crime and vandalism. In one of the programmes in Talbot Park, the local Maori warden stated:

> "This used to be a filthy place, even the police didn't like having to go there. It was a really threatening environment – no place for kids to grow up. The most important thing the project has achieved so far is tidying up the area. At this stage it looks like they will have a higher standard of housing and better quality tenants."

Amongst the tenants, 46% of those interviewed felt safer, 50% felt the level of vandalism and graffiti had reduced and 42% felt that criminal activity had reduced since the Community renewal projects had started. The report assessment stated that a reduction in crime is a very difficult outcome through Community Renewal due to many factors being outside housing control. This includes the extent of the police presence, difficult families, gangs and residents with criminal connections. There is also a problem with hard drugs and alcohol abuse in these communities[39].

Healthy communities have been added to the outcomes for community renewal as a result of the evaluation feasibility and design study in 2005[40]. The results of improving the energy efficiency of tenant's houses had not been very effective. This may have been due to a mild winter meaning less heat had been used anyways, and the fact that some tenants did not know how to use a heat pump effectively.

Children's and young people's housing experiences: Issues and scoping paper[41]

The aims of this report were to assess the links between young people's social, cultural and economic outcomes with their housing circumstances.

This report notes that most of the research carried out involves the connection between housing and health. Key factors in the healthiness of homes included overcrowding and dwelling condition and performance, which included cold, damp, mouldy houses and houses with poor air quality. This report does not concentrate on Housing New Zealand tenants in particular but incorporates international and domestic research from a number of government departments.

---

[39] *Community Renewal Programme Evaluation 2005/06, Final*; Dianne Buchan and Kirsty Austin; Prepared for Housing New Zealand Corporation, Research and Evaluation Team; March 2006; Page 49
[40] As for note 38; Page 61
[41] *Children's and Young People's Housing Experiences: Issues and Scoping Paper*; Bev James; Public Policy & Research; Prepared for Centre for Housing Research Aotearoa New Zealand; July 2007

There has been significantly less research completed on the link between housing and educational outcomes than the link between housing and health. The research that has been completed has concentrated on:

- The effects of poor quality housing on children's learning (in terms of crowding and dwelling condition);

- The link between tenure insecurity, consequential residential movement and education achievement; and

- The effect the neighbourhood environment has on educational outcomes.

Crowding and dwelling condition

There is limited research on the housing effects on education, and studies completed do not separate the effects of household crowding from dwelling condition. Two international studies which New Zealand took part in, PISA and PIRLS[42] have shown that reading achievement and reading literacy is improved in households where the children have home educational resources, such as a quiet place to study and a desk to study.

Tenure, tenure security and residential movement

There is limited information on residential movement domestically, but in international studies it has been shown that frequent residential movement is detrimental to the children's school attendance and educational achievement[43]. International studies have shown that home ownership is an important factor in the length of tenure and can also help finance higher education. In New Zealand, there have only been limited small studies on the effects of movement. However, all studies have shown that high movement rates are linked to low socio-economic areas[44].

Housing, neighbourhoods and educational outcomes

Canadian studies have shown that neighbourhood environments with high levels of drug dealing, crime and poverty generally result in lower educational attendance and attainment from the children living in these neighbourhoods. However, neighbourhood factors are not the main factor behind the educational achievement, with poor child outcomes more likely to be due to a one-parent family structure and low socio-economic status[45].

---

[42] PISA (Programme for International Student Assessment), PIRLS (Progress in International reading Literacy Study)

[43] Children's and Young People's Housing Experiences: Issues and Scoping Paper; Bev James; Public Policy & Research; Prepared for Centre for Housing Research Aotearoa New Zealand; July 2007; Page 25

[44] As for note 42; Page 26

[45] As for note 42; Page 26

Measures of Overcrowding: Extract from Statistics New Zealand[46]

The Canadian National Occupancy Standard (CNOS) has been developed by the Canada Mortgage and Housing Corporation (CMHC) to help determine the number of bedrooms a dwelling should have to provide freedom from crowding. The CNOS is based on the number, age, sex and interrelationships of household members and is the most complex of the crowding indices in the Housing Indicators series.[47]

The CNOS states that:

- no more than two people shall share a bedroom;

- parents or couples may share a bedroom;

- children under 5 years, either of the same sex or opposite sex may share a bedroom;

- children under 18 years of the same sex may share a bedroom;

- a child aged 5 to 17 years should not share a bedroom with a child under 5 of the opposite sex; and

- single adults 18 years and over and any unpaired children require a separate bedroom.

In the work of CMHC, the CNOS is used in combination with other indicators of state of repair and cost to produce a composite indicator of "core housing need". It is not possible, therefore, to make direct comparisons between levels of crowding in Canada and New Zealand since the Canadian data is output in a different format. Namely, a household in Canada is deemed to be crowded if it has insufficient bedrooms (according to the CNOS), and if it would have to spend thirty percent or more of its total before-tax income to obtain alternative accommodation of an adequate size. According to these criteria, in 1996 2.1 percent (222,430) of Canadian households were deemed crowded.[48]

This indicator applies the CNOS to data from the New Zealand Census of Population and Dwellings and purely provides a crowding measure. In 2001, 5.1 percent of New Zealand households were crowded, that is, they required one or more extra bedrooms to satisfy the conditions of the CNOS. Similar analysis carried out by the Australian Bureau of Statistics on data from the Australian Housing Survey showed that, in 1999, 3.5 percent of Australian households were crowded.[49]

---

[46] Extract from:
http://www2.stats.govt.nz/domino/external/web/prod_serv.nsf/092edeb76ed5aa6bcc256afe0081d84e/5fc1e29
f9dda2bc0cc256dd5006e47d3?OpenDocument
[47] The formulation of the Canadian National Occupancy Standard is fundamentally linked to the social norms of Canadian society. As such, it may not comprehensively reflect accepted concepts and standards of household and family in New Zealand.
[48] Canada Mortgage and Housing Corporation (2001), *Canadian Housing Statistics, 2001. Table 68.* Ottawa. NOTE: this figure was updated on 25/06/2003 with new information from CMHC.
[49] Comparison of New Zealand and Australian data should be undertaken with care. Methods of enumeration and analysis used in the New Zealand Census of Population and Dwellings are different from those used in the Australian Housing Survey.

The occurrence of crowding is highly variable across New Zealand. Using the CNOS, in 2001, 13.1 percent of households in Manukau City were crowded, and of these 36 percent required two or more extra bedrooms. In contrast, only 1.3 percent of Mackenzie District households were crowded, with 11.8 percent of these requiring two or more extra bedrooms. Otorohanga District, with 5.2 percent of households crowded and 22.8 percent of these requiring two or more extra bedrooms was closer to the New Zealand average (5.1 percent of households crowded, 23.7 percent of these requiring two or more extra bedrooms).
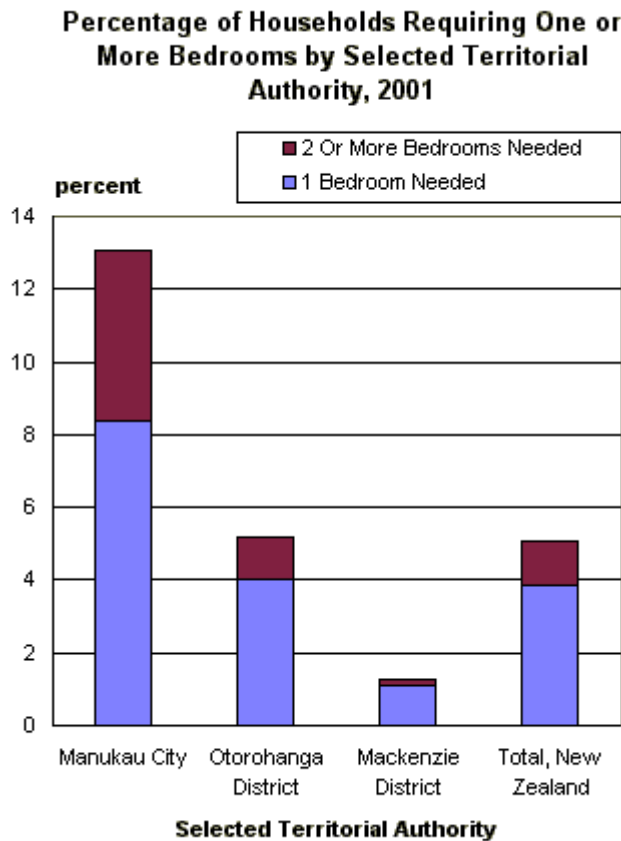
Figure 10 *Housing Need*

Appendix B: Approach to Measuring Potential Marginal Benefits from Investment in Housing Interventions

Health

Table 10 Quantification of Health Benefits

Benefit	Increase the number of households living in an environment which is not detrimental to health outcomes
Definition	Increased numbers of households with access to accommodation which meets a (yet to be defined) healthy living standard, which will result in: • fewer hospitalisations • lower demand for primary healthcare • higher levels of labour market participation This may be achieved through: • Reduced overcrowding; • Warmer average indoor temperatures; and/or • Drier living environments and hence less fungal/bacterial activity. Research has shown statistically meaningful reductions in levels of hospitalisations for the following state housing tenant categories: • State house tenants on average have lower levels of hospitalisation than applicants (on waiting lists) and this benefit increases with increased duration of tenancy up to 4 years approx when it plateaus[50] • Evaluation of Housing New Zealand's "Healthy Housing Programme" has shown that participants also demonstrate reduced levels of hospitalisation compared against other state house tenants. The level of benefit will depend on the current gap between healthiness of housing provided (State and non-government) and the desirable level of healthiness. The marginal level of benefits will reduce as this gap closes. The assessed value of benefits relating to interventions is on a per household basis. The available information does not allow for allocation of benefits across different household types. Further, it is not possible to make the simplifying assumption that housing units with more bedrooms will experience greater benefits on the basis that there are likely to be more people living in such units since many of the risks are related to over-crowding.
Intervention linkages	• State housing – new houses designed to meet healthy housing standards; housing modernisation programme targets improvement of existing housing stock to meet, where possible, healthy housing standards. This benefit will be ongoing and compounding. • Non-government – new houses can be expected to provide similar benefits to state houses This benefit may be time limited if there is no guarantee of continued provision targeted at those in greatest need. • First home ownership assistance – no direct linkage. May be an indirect outcome.

---

[50] Refer Appendix A for research summaries. Note that both tenants and applicants have higher rates of hospitalisation (on average) than the rest of the population.

Benefit	Increase the number of households living in an environment which is not detrimental to health outcomes
Data to be collected	*To Assess Scale of Problem:* • Number of families on waiting lists for State Housing and assessed as Priority A/B (proxy for those likely to most benefit from new State housing provision). • Number of families on waiting lists for non-government housing and assessed as High Priority (proxy for those likely to most benefit from investment in non-government additional social housing provision (or retention)). • Remaining number of State housing units considered to be below healthy housing standards. • Estimated number of non-government housing units considered likely to fall well short of healthy housing standards. *To assess value:* • Value of meeting healthy housing standard as measured by fewer hospitalisations. • Other measures of value TBD. *To Assess Marginal vs Average Benefit Curve* • Total current and projected levels of expenditure on State House modernisation programmes. • Proportion of expenditure specifically targeted at meeting healthy housing standards (State). • Number of State housing units projected to be modernised, and within this percentage expected to benefit from improved healthy housing standards. • Number of new housing units projected to be added to State housing portfolio which will meet healthy housing standards. • Number of new housing units projected to be added to non-government provision which will meet healthy housing standards. • Total number of housing units provided by the non-government. • Number of non-government housing units to be brought up to meet healthy housing standards through investment.
Input Parameters	• Value of investing in existing housing to meet healthy housing standards (Healthy Housing Programme). • Value of providing an additional housing unit to an applicant who would otherwise remain on the waiting list. • Combined value of providing an additional housing unit to an applicant which meets healthy housing standards (e.g. a new build). • Following further research, some way of distinguishing between different household types (1Br, 2 Br etc.). • Following further research, slope of curve for marginal benefits with increased level of investment.
Formula Used	***Average benefits:*** • Value of benefit per additional new State Housing unit. • Value of benefit per additional State housing units brought up to healthy housing standards times the factor to account for difficulty in meeting all healthy housing standards for an existing property. • Value of benefit per additional new non-government housing unit times the benefit attrition rate over time (e.g. to account for risk of non-government exiting from social housing provision in future). • Value of benefit per additional non-government houses brought up to healthy housing standards times the factor to account for difficulty in meeting all healthy housing standards for an existing property times the factor to apply to confidence in non-government investment full delivery of benefit times the benefit attrition rate over time.

Benefit	**Increase the number of households living in an environment which is not detrimental to health outcomes**
	Marginal benefits: • Rate of drop-off in benefits for further investment, described as a function of: o the remaining number of households on waiting lists (category A/B or equivalent for non-government); and o the remaining number of existing housing units where investment via the Healthy Housing programme or similar would generate benefits for existing tenants

Education

Table 11 Quantification of Education Benefits

Benefit	Increase the number of households living in an environment which encourages increased educational achievement
Definition	Increased numbers of households with access to accommodation which increases educational achievement through: • Enhanced duration of tenancy tenure; • Specific programmes targeting community renewal, reduced truancy levels etc; • Reduced illness; • Reduced overcrowding; and • Quieter home and study areas. This may result in: • Higher educational achievement by young people in house; • Increased average wages and therefore increased tax revenues; and/or • Increased GDP per person. The level of benefit will depend on the extent to which the design or other characteristics of currently provided social housing creates a barrier to educational achievement – for example, if a child is constantly sick due to an unhealthy house and cannot go to school. The marginal level of benefits will reduce as this gap closes.
Intervention linkages	• State housing – additional housing units provided which meet healthy housing standards and good levels of amenity, e.g. room to study. • The Healthy Housing Programme specifically aims to match house amenity with needs of the household – including needs of children and young people. • Community renewal programmes aimed at improving participation in education. • Non-government – additional housing units as for state housing. This benefit may be time limited if there is no guarantee of continued provision targeted at those in greatest need. • Accommodation Supplement allows people to choose where they wish to live, providing opportunities to live closer to schools, and if a family needs to move they can move nearby to ensure their children stay in the same school with their friends. • First home ownership assistance – May be an indirect outcome, as people would want to buy a house with a good level of insulation, near popular schools.
Data to be collected	*To Assess Scale of Problem* • Number of families on waiting lists for State Housing and assessed as Priority A/B (proxy for those likely to most benefit from new State housing provision). • Number of families on waiting lists for non-government housing and assessed as High Priority (proxy for those likely to most benefit from investment in non-government additional social housing provision (or retention)). *To Assess Value:* • Linkage between housing investment and levels of educational attainment • Value of the children of low income households having a higher level of education (studies show higher education = higher income).

Benefit	**Increase the number of households living in an environment which encourages increased educational achievement**
	To Assess Marginal vs Average Benefit Curve: • Total current and projected levels of expenditure on State House programmes (Healthy Housing, Community Renewal), and number of impacted housing units; • Number of new housing units projected to be added to State housing portfolio; and • Number of new housing units projected to be added to non-government provision.
Input Parameters	• Increased levels of educational achievement for a given level/type of investment (e.g. from NCEA level 1 to 2). • Value to apply (increased income level). • Factor to apply to investment in State housing versus non-government • If possible, some way of distinguishing between different household types (1Br, 2 Br etc). • Slope of curve for marginal benefits with increased level of investment.

Formula Used	***Average benefits:***
	• Value of benefit per additional new State housing units to be built or bought.
	• Value of benefit per additional new non-government housing units to be built or bought.
	• Value of benefit per State House subject to investment through Healthy Housing Programme.
	• Value of benefit per State House improved through the community renewal project.
	• If possible, some way of distinguishing between different household types (1Br, 2 Br etc).
	
	Marginal benefits:
	• Rate of drop-off in benefits for further investment, described as a function of:
	  – the remaining number of households on waiting lists (category A/B or equivalent for non-government); and
	  – the remaining number of existing housing units where investment via the Community Renewal programme or similar would generate benefits for existing tenants.

Crime

Table 12 Quantification of Benefits from Reduced Criminal Activity

Benefit	**Increase the number of households living in an environment which discourages criminal activity**
Definition	Increased numbers of households living in an environment with average or better than average levels of criminal activity, which will result in: • Fewer arrests; • Less police time spent on crime; • Less court time; and • Fewer custodial sentences. This may be achieved through modernisation and community renewal programme which target: • Better lighting, security upgrades, fencing and street-scaping in social housing high crime risk areas; • Improved community awareness of safety through neighbourhood support groups; and • Improved social networks and community support through street barbeques, gardening workshops and family fun days. Provision of additional state housing units with income related rent provides financial benefits to tenants which may also provide benefits to society to the extent that crimes are partly driven by poverty. The level of benefit will depend on the current gap between the crime rate experienced by those in social housing areas which currently experience higher than average levels of criminal activity and have not been through any form of community renewal programme and those who live in similar areas which have had investment in community renewal. The marginal level of benefits will reduce as this gap closes. As for health outcomes, it is not possible to allocate benefits across different household types. Some household types may experience benefits disproportionate to size, e.g. those with young men in the highest risk age bracket of criminal activities.
Intervention linkages	• State housing – new houses designed to meet community renewal standards; improved security, lighting, fencing. Improvement of security of existing housing stock. This benefit can be considered to be ongoing and compounding. • Non-government – depends on loan conditions, e.g. is having a certain level of security a condition of loan approval? If so, how is this monitored? Is there more community involvement in non-government due to the nature of those in charge – iwi, community, local govt – more likely to provide opportunities for the housing community to get to know each other and trust each other. This benefit may be time limited if there is no guarantee of continued provision targeted at those in greatest need. • First home ownership assistance – no direct linkage. May be an indirect outcome since there may be less likely to be concentrations of criminal activities in neighbourhoods with high rates of home ownership.
Data to be collected	*To Assess Scale of Problem* • Number of families on waiting lists for State Housing and assessed as Priority A/B (proxy for those likely to most benefit from new State housing provision). • Number of families on waiting lists for non-government housing and assessed as High Priority (proxy for those likely to most benefit from investment in non-government additional social housing provision (or retention)).

Benefit	Increase the number of households living in an environment which discourages criminal activity
	To Assess Value: • Linkage between housing investment and levels of educational attainment (number of fewer crimes linked to different types of investment – additional houses, investment in existing houses etc). • Value of fewer crimes as measured by reduced use of police and justice time, and reduced harm to community. *To Assess Marginal vs Average Benefit Curve:* • Total current and projected levels of expenditure on State House modernisation programmes; • Proportion of expenditure specifically targeted at community renewal (State); • Number of State housing units projected to be modernised, and within this percentage expected to benefit from improved security and community support; • Remaining number of State housing units considered to have below par security standards; • Number of non-government housing units projected to be brought up to meet community renewal standards through investment; • Number of new housing units projected to be added to State housing portfolio which will meet community renewal standards; • Number of new housing units projected to be added to non-government provision which will meet community renewal standards; • Total number of housing units provided by the non-government; and • Estimated number of non-government housing units considered likely to be at high risk for criminal activity.
Input Parameters	• Number of fewer crimes committed per investment in new State Housing/non-government unit. • Number of fewer crimes committed per investment in housing unit under Community Renewal programme. • Value of each crime not committed (reduced cost to Government). • If possible, some way of distinguishing between different household types (1Br, 2 Br etc). • Slope of curve for marginal benefits with increased level of investment.

Formula Used	*Average benefits:*
	• Number of fewer crimes committed per additional new State housing unit times the Value of each crime not committed.
	• Number of fewer crimes committed per household invested in through State house community renewal programme times the Value of each crime not committed.
	• Number of fewer crimes committed per additional new non-government housing unit times the Value of each crime not committed.
	• Number of fewer crimes committed per non-government household invested in through community renewal equivalent type programme times the Value of each crime not committed.
	
	Marginal benefits:
	• Rate of drop-off in benefits for further investment, described as a function of:
	  – the remaining number of households on waiting lists (category A/B or equivalent for non-government).
	  – the remaining number of existing housing units where investment via the Community Renewal programme or similar would generate benefits for existing tenants.

Appendix C: Financial Model User Guide

A financial model has been design to assist the calculation of the net benefits of housing interventions if the appropriate data assumptions were available. The model uses the NZIER cost model as a base, with additional worksheets added to produce a fully integrated model.

This model has been set up to calculate the net benefits of providing state housing, non-government housing provision and modernisation under the healthy homes programme depending on the size of the house. In order to calculate the net benefits a significant number of key input assumptions are required (e.g. unit volume assumptions, basic needs met benefit and modernisation cost assumption) but the functionality has been built into the model so that the data can been incorporated into the model in the future. These assumptions are currently set to zero. All of the assumptions from the model are set out in the assumptions book in the following section.

This guide is to cover the worksheets which have been added to the base model and these are set out below. The other worksheets have been produced by NZIER and are covered by the 'Excel Model Documentation Costs of Housing Intervention' word document.

Model code

- Blue font with yellow shading represents input assumptions
- Pink font in brackets represents guidance comments on particular assumptions or calculations
- A red triangle in the top right hand corner of a square indicates a comment, hold cursor over cell to view comment
- Black font represents a label or formula

'Assumptions' worksheet

This is the input assumptions worksheet. Note that where input assumptions are not currently available the majority of these have been set to zero and the calculation still flows through the model so when the appropriate data is produced the model can be updated.

'Benefits Calcs' worksheet

Workings for calculation of the following benefits; health, crime reduction, education and basic needs met benefit. The benefits have been assumed to be the same for state houses and for non-government provided houses.

- **Health** - The model has the functionality to calculate the health benefits for new units and for the modernisation of units based on an assumption of the average number of people per house size

- **Crime reduction** - The model has the functionality to calculate the benefit of crime reduction for new units and upgraded units through community renewal. The impact on crime reduction is most likely to be quantified at the household level rather than per individual so the calculation will be consistent across all house sizes. As there is no current data quantifying the reduction in crime, no benefit can be calculated.

- **Education -** The model has the functionality to calculate the future benefit of higher average wages over a working life as a result of improved educational achievement based on an average number of children per house size. It has been assumed that this is only the case for new units and that modernisation has no educational benefit As the is no current data on the additional proportion of children gaining the educational qualification as tenants or through upgrading no benefit can be calculated.

- **Basic needs met -** The model has the functionality to calculate the benefit of basic needs being met by house size for new units and upgrading of units. As there is no current data quantifying meeting the basic needs of an individual no benefit can be calculated.

'Outputs' worksheet

Worksheet setting out benefits, costs and net benefits of different situations. The model has the functionality to calculate the benefits by unit and for the total number of new units and modernised units.

The main output from the model has been as Annual Equivalent Return Cash flows for consistency with the cost inputs from the NZIER model which is analysed over a different time period. It converts the new present value to the equivalent annual cash flow.

- **Net benefit -** Calculates the annual equivalent net benefit (benefit less cost) of an additional State house, non-government house and modernisation of a housing unit. As the NZIER cost model provides the costs for three different scenarios (single with zero, one and two children). A drop down box enables the outputs to be provided under each scenario (note this only impacts on cost). As the NZIER model only identifies costs for new build the cost of modernisation is currently zero in the model.

- **Units -** Calculates the number of new units and modernised units for State houses and non-government (reliant on future inputs).

- **Benefits undiscounted -** Calculates the total benefit over a 15 year period for each benefit category with the exception of the education benefit which is a calculated as the future benefit of higher wages over the working life of an individual (18 to 65 years old). The benefits are calculated per unit and multiplied by the number of units to give a total for all units.

- **Benefits NPV-** Calculates net present value of the benefits using a discount rate of 7.5% (except education benefit which is discounted at 10%).

- **Benefits Annual Equivalent -** Calculates the annual equivalent cash flow for each benefit.

- **Costs Annual Equivalent -** Extracts the costs for a new state house (including rent) and non-government house (local government housing innovation fund and accommodation supplement) as per the government perspective from the NZIER worksheets

Underlying assumptions

- No allowance is made for tenant churn on the basis that tenants leaving do so on a rational basis - i.e. move to housing equal or better than existing (including to another State House). The benefit therefore attaches to the new housing unit rather than to the household per se.
- It is assumed that for an average 2br unit (for example) there will be an average household composition except where otherwise stated.
- Assumed any "new" state house either built or acquired would meet equivalent healthy housing standard.
- The benefits have been assumed to be the same for state houses and for non-government provided houses.

Appendix D: Assumptions Book

Table 13 Assumptions Book

Category	Assumption Description	Assumption	Source
General			
	Model start date	30/06/07	Deloitte
	Discounting	Mid year	Deloitte
	Life of model for benefits calculation	15 years	Deloitte
Volume			
	State housing total waiting list	O/S	O/S
	SH Breakdown of waiting list by priority A – D%	O/S	O/S
	SH Proportion of priority met A – D%	O/S	O/S
	SH House size 1bedroom – 4 plus bedrooms %	O/S	O/S
	Non-government total waiting list	O/S	O/S
	Non-government % high priority	O/S	O/S
	Non-government % of high priority housing met	O/S	O/S
	SH House size 1bedroom – 4 plus bedrooms %	O/S	O/S
	Number of State houses	O/S	O/S
	% SH requiring modernisation	O/S	O/S
	% SH requiring modernisation met	O/S	O/S
	Number of Non-government houses	O/S	O/S
	% Non-government houses requiring modernisation	O/S	O/S
	% Non-government houses requiring modernisation met	O/S	O/S
Basic needs met benefits			
	Benefit per household per annum for new units 1 bedroom – 4 plus bedrooms	O/S	O/S
	Benefit per household per annum for upgrade 1 bedroom – 4 plus bedrooms	O/S	O/S
	Discount rate used to calculate NPV	7.5%	NZIER/Deloitte
Health benefits			
	Average cost of preventable admission	$2,500	Gary Jackson CMDHB 27/08/07
	Annual hospitalisation rate for social housing applicants	128.5/1000	Figure from "social housing may markedly reduce hospitalisations: Results from a large cohort study"
	Annual hospitalisation rate for tenants (derives benefit after 4 years of living in State housing)	104.2/1000	Figure from "social housing may markedly reduce hospitalisations: Results from a large cohort study"
	Annual hospitalisation rate benefit of HH programme	38.5/1000	Based on 37% reduction in acute admissions – study on "The impact of housing improvements on acute hospitalisations at Middlemore"
	Average number of occupants per household (1 bedroom – 4 plus bedrooms)	O/S	O/S
	Discount rate for health benefit	7.5%	NZIER/Deloitte
Crime reduction benefits			
	Average cost per crime recorded involving police and court time (excluding sexual offence, fraud and	$3,457	"Estimating the costs of crime in New Zealand

	serious traffic offences)		2003/2004"
	Reduced rate of crime as a result of a new housing unit	O/S	O/S
	Reduced rate of crime as a result of community renewal	O/S	O/S
	Discount rate for crime rate	7.5%	NZIER/Deloitte
Education benefits			
	School certificate education level average weekly wage per person	$516	Statistics New Zealand
	Sixth form certificate education level average weekly wage per person	$556	Statistics New Zealand
	Proportion of increased wage attributable to society (marginal tax rate)	19.5%[1]	Deloitte
	Average number of children per household (1 bedroom – 4 plus bedroom)	O/S	O/S
	Proportion of children obtaining additional qualification	O/S	O/S
	Average age of tenant child	O/S	O/S
	Average working life	18 - 65	Deloitte
	Discount rate for Education benefits	10%	Deloitte
Cost assumptions			
	All costs in relation to state housing and non-government housing linked to NZIER model		NZIER
	Healthy Housing programme average cost per household size (1 bedroom – 4 plus bedroom)	O/S	O/S

[1] This captures only the direct cash flow effect arising from higher income – it does not measure the flow on economic benefits from raising income levels.