The Building Act 2004 and the Inclusion of the New Zealand Fire Service in the Building Consent Process

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ABSTRACT

This report outlines the changes to the Building Act in 2004 and the inclusion of the Fire Service in the building consent process, with the intention of assessing the impact of these changes on performance based design work in New Zealand. To achieve this the following was undertaken:

The report sets out the background to the legislative changes to the Building Act in 2004 and how these changes have impacted the New Zealand Fire Service. It then explores the Fire Service's response to these legislative changes in its legislative role of reviewing specific building consent applications

A review was undertaken of the building data held within the Fire Service's engineering database covering in excess of 2,700 buildings forwarded by the 75 Building Consent Authorities (BCA's) throughout New Zealand since 2005. This data is then compared to that of non-residential building consent applications received by BCA's throughout New Zealand, highlighting trends in the building consent process since the inception of the Fire Service's Design Review Unit.

The report investigates the outcomes of the independent audit of the Design Review Unit and the quality of performance-based fire engineering design reports reviewed as part of that audit. In addition, a review of the qualifications and professional memberships of the report authors was also undertaken.

A questionnaire was sent to members of the fire industry seeking their feedback on the potential impacts on their work following the changes to the Building Act in 2004. It included specific questions relating to the design work they undertake and the role of the Fire Service in the building consent process.

A consistent increase in non-residential building consents received by local Councils is evident since 2005. This has not been mirrored by an increase in the numbers forwarded to the Design Review Unit, with numbers consistently dropping in the main centres of Auckland, Wellington and Christchurch.

Results of the independent audit of the Design Review Unit commissioned by the Fire Service Commission highlight several issues with the manner in which performance based fire engineering design is being carried out in New Zealand. Although opportunities for improvement of the Design Review Unit were also suggested, overall the Design Review Unit is carrying out its legislative function in a technically competent manner.

A breakdown of the qualifications and professional memberships of the audited report writers show that the majority hold a Masters Degree in fire engineering and also membership to national and international engineering bodies. 12% of report authors had no formal qualification in fire engineering and no professional memberships.

94% of respondents to the questionnaire represented the fire engineering design sector. The majority were not supportive of the changes to the Building Act in 2004 and are of the view that these changes have created more problems during the building consent process. Whilst some respondents were supportive of the Fire Service being involved in the consent process, this was mainly viewed as being only relevant to freighting and evacuation issues. Others were not supportive of the Design Review Unit at all. Respondents indicated that performance based design work now accounts for less of their workload than before the Building Act changes were implemented.

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1 INTRODUCTION

New Zealand has worked within a performance based building code system since 1992. In so doing, designers have not been restricted to a purely prescriptive design methodology, thereby limiting the scope for broader design approaches and the utilisation of specific fire engineering principles.

Prior to the Building Act changes in 2004, the New Zealand Fire Service were not formally involved in the building consent process in any way. Involvement in design matters were at the request of building designers or local councils when specific issues required Fire Service input, for example firefighting access or water supplies. Although the Fire Service could be involved under such circumstances, they had no legal mandate or powers in regards to determining building code compliance.

Prior to the 2004 changes to the Building Act, the Fire Service had a legal mandate to administer the Fire Safety and Evacuation of Buildings Regulations (the Regulations). They still hold this mandate today. Although the Regulations require the owner of certain buildings to apply to the Fire Service for an evacuation scheme, this process is generally undertaken after a building had been built. In the course of approving these applications, the Fire Service was noticing non-complying building work and this began to present issues for the Fire Service in approving these applications.

As the approval of evacuation schemes lie outside of building compliance matters, the Fire Service were compelled to approving an application on the basis that they were satisfied that the processes and procedures put in place by the building owner would ensure the safe and efficient evacuation of the building's occupants in the event of a fire emergency. However, the Fire Service as a party to the Building Act, could seek a determination from the Department of Building and Housing requesting that clarification be sought in relation to the non-compliance issues they felt were evident. This course of events is long and costly and the ability to rectify issues once the building has been built

can prove very difficult. Specific issues within the fire industry in terms of design, construction and maintenance then became more apparent and the leaky buildings crisis that had already been identified in New Zealand compounded matters further.

Changes in the Building Act were then implemented in an attempt to ensure that a crisis like this did not occur again and to further ensure that buildings were designed and constructed correctly the first time. As part of these changes the Fire Service were included in the provisions of the Building Act and for the first time, were provided with a legislative mandate to provide advice to BCA's relating to certain types of building consent applications.

2 THE NEW ZEALAND REGULATORY SYSTEM

Prior to 1992, fire safety regulations in New Zealand operated under a prescriptive regime. Such prescriptive requirements provided direct guidance in specific terms for those designing buildings and in effect dictated design criteria.

In December 1991 a new Building Act[1] was passed in law, replacing the existing prescriptive fire safety code, NZ Standard 1900, Chapter 5[2]. In doing so, it allowed for performance-based design to be carried out for the first time in New Zealand's history and offered designers a less restrictive design environment. The Building Act 2004 repealed the Building Act 1991 and dissolved the Building Industry Authority (BIA), which had regulated the building industry under the 1991 Act. Administration of the Building Act then shifted to the Department of Building and Housing (DBH), which was established on 1 November 2004. The Building Act 2004 has four main goals[3] :

- people can use buildings safely and without endangering their health
- buildings have attributes that contribute appropriately to the health, physical independence and wellbeing of the people who use them
- people who use a building can escape from the building if it is on fire
- buildings are designed, constructed and able to be used in ways that promote sustainable development.

In New Zealand, the regulation and performance of buildings sits under a three-part framework[4]:

- the Building Act, containing the provisions for regulating building work
- the Building Regulations of which there are 6 and include prescribed forms, specified systems, Change the Use, and set out the fees for determinations and levy
- the Building Code[5] ,contained in Schedule 1 of the Building Regulations 1992 and contains the mandatory provisions for all new building work.

Figure 2.1: below illustrates New Zealand's building control framework.

All design work must satisfy the requirements of the Act and the Act sets out the mandatory framework for building control in New Zealand that must be followed when building work is undertaken. The Building Regulations contain the Building Code and this code sets out performance criteria that all building work must meet. The changes implemented in 1991 set out these mandatory performance requirements. Those relating to fire safety are outlined in the C clauses and contain four categories: C1 Outbreak of fire, C2 Means of escape, C3 Spread of fire and C4 Structural stability during fire.

In demonstrating compliance with the Building Code, a designer can choose to use the compliance documents[6] or provide an alternative solution. Compliance documents are published and maintained by the Department of Building and Housing (DBH) and outline prescriptive methods to comply with the performance criteria of the Building Code. An applicant for a building consent who uses these prescriptive methods, must be granted a consent by the BCA on the basis that they are utilised in full and no departure from them occur. Compliance with the performance requirements of the Building Code can also be demonstrated using alternative solutions. In these circumstances specific fire engineering design methods and analysis are utilised.

Assessing compliance with these performance requirements and their enforcement lies with the Building Consent Authorities (BCA's), formerly known as Territorial Authorities (TA's). They must be satisfied on reasonable grounds that the provisions of the Building Code would be met if the building work was completed in accordance with the plans and specifications submitted with the building consent application. At the discretion of the BCA, a performance-based design can be passed to an independent fire engineer for peer review, prior to the BCA issuing consent.

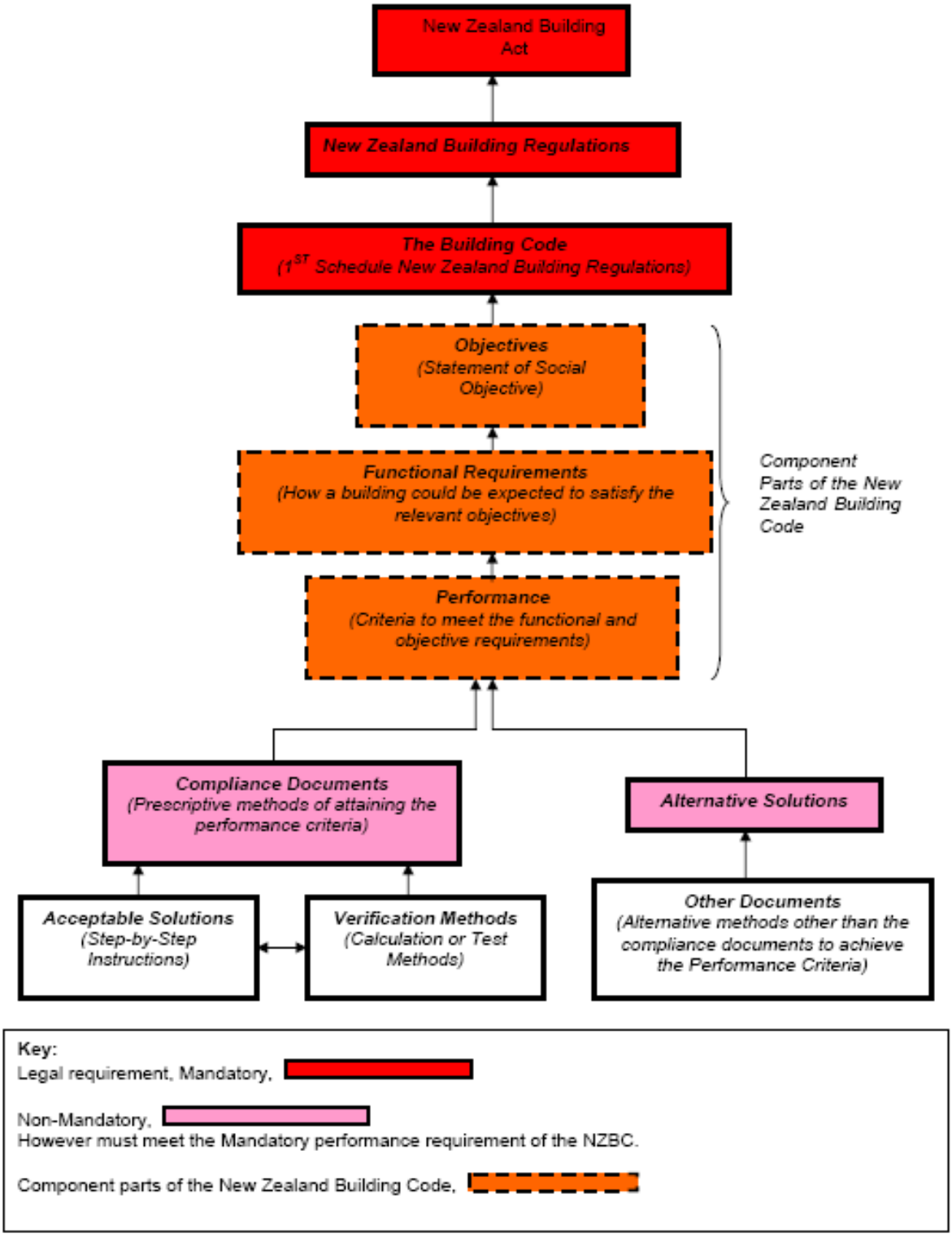


Figure 2.1: The regulatory framework in New Zealand

3 WHY A NEW BUILDING ACT?

The new Building Act came into force on 30 November 2004 and was introduced to improve building controls and building practices in the New Zealand building industry. In essence, its introduction largely arose due to the systemic failures in the building control processes that played a significant role in facilitating the "leaky buildings" crisis. The new Act intended to ensure that buildings are designed and built correctly the first time. It also sought to improve the quality of decisions made throughout the design and building processes by introducing a new framework for regulating building work and by establishing a licensing regime for building practitioners.

In addition, there were perceived conflicts between the requirements of the Fire Service Act[7] and the Building Act 1991. The Building Act 1991 modified the responsibilities of the New Zealand Fire Service (NZFS) under the Fire Service Act. This then required building owners to lodge an evacuation scheme[8] with the NZFS. This however, was only required 30 days following a code compliance certificate being issued for the building. Difficulties then arose for the Fire Service in processing evacuation schemes due to concerns relating to non-compliance and inadequate building work.

Although the Fire Service had and still does have the statutory obligation to notify the BCA's of non-compliant building work via Section 29(5) of the Fire Service Act, the only other avenue available to challenge the fire design process was to seek a determination under Section 17 of the Building Act 1991. A determination is a decision made by the Chief Executive of the Department of Building and Housing (formerly the Building Industry Authority (BIA)) on a technical matter of doubt or dispute which is legally binding on the parties involved unless overruled by an appeal to the High Court on a question of law. This process however, is a time-consuming and costly one.

In February 2002, the Hunn Group[9] were commissioned to investigate the issues relating to the leaky building syndrome. Part of the terms of reference included an investigation into whether the weather tightness failures were due to deficiencies in the Building Act and regulations or to the way in which they were administered.

Some of the findings included: that there were features of the Building Act and Code that were deficient and have contributed to the leaky building problem; and that the scope of the Government's review of the Building Act at the time be broadened to address these features and to explore how the Building Industry Authority should be structured to best achieve the purposes of the Act.

Following on from the findings of the Hunn report, the Government shifted the responsibility for the policy and regulatory functions from the Department of Internal Affairs to the Ministry of Economic Development (MED).

4 THE INCLUSION OF THE NZFS IN THE BUILDING ACT 2004

The changes to the Building Act in 2004 saw the NZFS conferred with a legislative role in the building consent process. This had never been the case in the history of building legislation in New Zealand. Although the Building Act 2004 now provides specific clauses involving the NZFS, the Act has also maintained previous sections of relevance to the NZFS. One such section is that relating to dangerous buildings. Under Section 121 of the Act, for the purposes of determining whether a building is dangerous, a territorial authority "*may seek advice from members of the New Zealand Fire Service who have been notified to the territorial authority by the Fire Service National Commander as being competent to give advice;…"* If advice is sought from the NZFS, the territorial authority must have due regard to the advice. The NZFS maintain a register of those persons deemed competent to give advice.

The second section which can involve the NZFS in a significant manner is Section 177 of the Act and relates to applications for determinations. A determination is "*a binding decision made by the Department of Building and Housing. It provides a way of solving disputes or questions about the rules that apply to buildings, how buildings are used, building accessibility, health and safety. A determination can be about building work that is planned, partly done or completed.*"[3] In relation to a determination, the NZFS is regarded as a party as per Section 176 of the Act and as such, can lodge an application with the Department of Building and Housing (DBH). To date, the NZFS have lodged several applications for determination with the DBH. Applications received to date can be accessed through the DBH's website[3].

The main reasoning for the inclusion of the New Zealand Fire Service Commission (the 'Commission') in the Building Act 2004 is (a) to minimise the risk of determinations being taken, thereby improving certainty for the building industry, (b) to ensure departures from the compliance documents in terms of facilities for fire fighting were approved by the Commission and not a Building Control Authority (BCA), and (c) to minimise the possibility of concerns being raised after a building has been completed which often proved difficult and very costly.

In effect, incorporating the NZFS into the Building Act was to create better linkages between the Building Act and the Fire Service Act. Under the Fire Service Act, the NZFS has the function of promoting fire safety and in addition, the National Commander of the NZFS has the function of approving evacuation schemes for certain buildings *(Section 21B(1) of the Fire Service Act 1975, requires owners of relevant buildings to provide and maintain evacuation schemes. The scheme must be designed to enable evacuation from the scene of a fire safely and in a reasonable time.)* As such, an evacuation scheme is all of the provisions and procedures put in place by the owner of a relevant building to meet the requirements of the Fire Service Act 1975 (including amendments) and the Fire Safety and Evacuation of Buildings Regulations 2006[8] are complied with. The evacuation scheme must then be approved by the Fire Service.

For the NZFS therefore, the functions of promoting fire safety and the approving of evacuation schemes for certain buildings, relate to the requirements of the Building Act and are primarily concerned with ensuring that people can escape from a building safely and firefighters who enter a building for the purposes of rescue or firefighting operations, are adequately protected.

The Building Act 2004 now places a requirement upon Building Consent Authorities (BCAs) to send a copy of certain applications for building consent to the NZFS for comment. NZFS Sections 46,47 and 48 of the Act describe the relevant NZFS relevant functions in the building consent process as well as that of the BCA should comments be made by the NZFS as per Section 47.

4.1 Section 46 of the Building Act 2004

Section 46 of the Act provides:

> ***Copy of certain applications for building consent must be provided to New* Zealand Fire Service Commission**
>
> *(1) This section applies to an application for a building consent that is of a kind specified by the chief executive by notice published in the Gazette.*
>
> *(2) A copy of the notice must be given by the chief executive to every building consent authority as soon as practicable after it is so published.*

(3) A building consent authority must, on receipt of an application to which this section applies, provide a copy of the application to the New Zealand Fire Service Commission.

The selected buildings to be reviewed were outlined by the Chief Executive of the Department of Building and Housing via Gazette Notice 56. This notice relates to buildings that require an Evacuation Scheme pursuant to Section 21(A) of the Fire Service Act 1975 in which the applicant proposes to demonstrate compliance by means of a performance-based design. This includes buildings that are sprinkler protected if that building would have required an evacuation scheme otherwise.

A Gazette notice is not a regulation. It has legal effect and must be complied with, but it is not part of a statute (Act). The matters specific to Gazette Notice 56 in regard to certain applications for building consent that must be sent to the Fire Service Commission can be seen in Appendix 1.

4.2 Section 47 of the Building Act 2004

Section 47 of the Act provides:

New Zealand Fire Service Commission may give advice on applications under section 46

(1) The New Zealand Fire Service Commission may, within 10 working days after receiving a copy of an application for a building consent under section 46, provide the building consent authority concerned with a memorandum that sets out advice on the following matters in respect of the building to which the application relates:

(a) provisions for means of escape from fire:

(b) the needs of persons who are authorised by law to enter the building to undertake fire-fighting.

(2) The New Zealand Fire Service Commission must not, in the memorandum referred to in subsection (1), set out advice that provides for the building to meet performance criteria that exceed the requirements of the building code.

(3) If the New Zealand Fire Service Commission does not provide a memorandum within the period specified in subsection (1), the building consent authority may proceed to determine the application without the memorandum.

Means of escape from fire and the needs of persons who are authorised by law to enter the building to undertake fire-fighting are cited as the two main areas where the NZFS can provide comment to the BCA's when reviewing a building consent application. For the purposes of providing comment to the BCA's, the Act defines means of escape from a building to be:

means of escape from fire, in relation to a building that has a floor area,—

> *(a) means continuous unobstructed routes of travel from any part of the floor area of that building to a place of safety; and*
>
> *(b) includes all active and passive protection features required to warn people of fire and to assist in protecting people from the effects of fire in the course of their escape from the fire*

In so doing, the Act has provided a broad definition and in the context of performance based design work, this can be interpreted to mean that NZFS comment can relate to almost every aspect of the design submitted for consent. In discharging its duties under section 47, the NZFS have a statutory timeframe of a 10 day period with which to provide the BCA with a memorandum that sets out its advice. In setting out this advice however, the Fire Service Commission cannot require the building to meet performance requirements that exceed the Building Code. The Commission must therefore provide a memorandum that either indicates it has no concerns or alternatively, that insufficient information or justification has been provided. The provision of a memorandum under section 47 does not constitute a formal peer review of the design work submitted as part of the building consent application.

4.3 Section 48 of the Building Act 2004

Section 48 of the Act provides:

Processing application for building consent

(1) A building consent authority must, within 20 working days after receiving an application for a building consent that complies with section 45,—

> *(a) grant the application; or*
>
> *(b) refuse the application.*

(2) A building consent authority may, within the period specified in subsection (1), require further reasonable information in respect of the application, and, if it does so, the period is suspended until it receives that information.

(3) In deciding whether to grant or refuse an application for a building consent, the building consent authority must have regard to—

(a) a memorandum provided by the New Zealand Fire Service Commission under section 47 (if any); and

(b) whether a building method or product to which a current warning or ban under section 26(2) relates will, or may, be used or applied in the building work to which the building consent relates.

(4) Subsection (3) does not limit section 49(1).

Once the buildings, as outlined by the Gazette notice have been sent to the NZFS, the BCA's must then have regard for any advice received when making a decision whether to grant Building Consent or not. Under the Act, advice provided by the Commission does not entitle them to have any role in the final decision making process of whether in their view, a building consent should be granted or not. The sole decision maker is the BCA and it can choose to accept or ignore any advice received from the Commission. In saying that however, there is currently no mechanism in place in New Zealand that provides feedback to the Commission on the action taken by the BCA's in relation to the advice given by them.

5 THE ENGINEERING FUNCTION WITHIN THE NZFS PRIOR TO THE 2004 BUILDING ACT

The NZFS is split into eight geographical fire regions for the purposes of the day-to-day management, the provision of efficient emergency response and the allocation of resources. Each region is overseen by its own management team. Fire engineering within the NZFS prior to the changes to the Building Act in 2004, provided technical support to each region's management by means of a local fire engineer. These engineers were geographically positioned to cover all of the fire regions and each engineer directly to a region's senior management team.

With the Building Act changes imminent, and to provide more effective and integrated engineering support to the NZFS, the engineering function was reformed to fit a nationalised structure. Regional fire engineers were maintained in their geographical positions but now reported through the national Fire Engineering Manager, through (at that time) to the Director of Engineering, Information, Research and Strategic Analysis (EIRSA) at Fire Service National Headquarters, Wellington. The role of the Director of EIRSA is now titled the National Director Fire Risk Management. This nationalised structure allowed a uniformed approach to the engineering function within the NZFS and allowed for easier management of resources and core functions.

One of the main functions of the regional fire engineering team is to engage with building owners, consulting fire engineers, architects, BCA's and represent the NZFS at pre building consent design meetings. This process allows for the input of all relevant stakeholders in the design process to discuss relevant issues relating to the building design. It also ensures that items of relevance to a particular stakeholder (e.g. firefighting water supplies) are made aware to the other parties and any implications or issues can be tackled.

Entering the engineering team in NZFS is done through three streams; at technician level where a candidate possesses no formal technical qualification; at fire engineer level with a formal qualification in fire engineering and at senior fire engineer level, where the candidate would possess a Masters degree in fire engineering and several years of technical and management experience. The NZFS also supports staff (Fire Safety Officers, operational firefighters) interested in gaining further technical experience and assists them in studying for

both undergraduate qualifications relating to fire engineering as well as for their Masters Degree in fire engineering at the University of Canterbury, Christchurch.

In addition to the regional support functions, the fire engineering team represent the Fire Service on various national standard committees. Examples include: NZ 4541 (Automatic fire sprinkler systems), NZ 4503 (Hand-operated fire fighting equipment), NZ 4509 (Fire fighting Water Supplies), NZ 4510 (Rising Main Systems for Buildings), NZ 4512 technical committee (Fire detection and alarm systems in buildings), and the Department of Building and Housing's review of the provisions for F6, Lighting for Emergency. They are also involved in the training functions of the NZFS, delivering courses to NZFS personnel pertaining to fire science and firefighting, fire dynamics, building construction and building materials. In addition, they provide on-scene technical support to operational officers at fire emergencies, they provide support to other NZFS personnel at fire investigations and conduct post fire emergency incident analysis.

5.1 The international fire engineering guidelines (IFEG)

In May 2005, the Department of Building and Housing released the International Fire Engineering Guidelines as guidance under section 175 of the Building Act 2004. They were developed to assist fire engineers, and others involved in the development of buildings to follow an agreed process so as appropriate solutions could be developed that follow international best practice. New Zealand operates under a performance based building code, and in addition has developed a prescriptive compliance document to assist designers in demonstrating compliance with the fire clauses of the Building Code. This, however, is only one means of demonstrating compliance and the compliance document is not a mandatory one. Designers are free to produce alternative solutions to this compliance document to demonstrate compliance with the performance requirements of the Building Code. The IFEG serves as guidance to those undertaking these alternative solutions.

The guidelines were developed through collaboration between the Australian Building Codes Board, the Canadian Codes Centre of the National Research Council of Canada, the United States International Codes Council and the Building Industry Authority, New Zealand. New Zealand has developed its own country-specific section, Part 0 that provides a link between the regulatory framework for New Zealand and the international sections of the IFEG.

The NZFS have endorsed the introduction of the IFEG by the Department and it is these guidelines that NZFS support in the discharging of their duties under section 47 of the Act. In addition, these guidelines have also been endorsed by IPENZ and the Australasian Fire Authorities Council. As a follow up to the introduction of the IFEG, representatives of the NZFS and the DBH conducted a series of fire engineering seminars in 2006 and 2007 intended to cover the process of design and design documentation requirements for building consent. In addition, they also covered the role and use of the IFEG. The seminars were attended by BCA's, fire engineering designers, architects and project managers.

6 THE DESIGN REVIEW UNIT OF THE NEW ZEALAND FIRE SERVICE (DRU)

Response to the 2004 legislative changes saw the Commission establish the Design Review Unit (DRU), in order to discharge its obligations under sections 46 and 47 of the Building Act. This unit operates from a central location and is based in Auckland. All building consent applications received by the 75 BCA's throughout New Zealand are sent to this location, where the DRU, processes them and maintains its own records of all applications received and the advice it then provides. The DRU began operation in April 2005.

The DRU charge for the work it completes, however, this is done so on a cost recovery basis only with no provision in its charging structure to generate profit. BCA's are initially invoiced for the work performed by the DRU engineers. These charges are based on an hourly rate for the time spent in terms of Section 47C(1) of the Fire Service Act 1975 *(Income of Commission)*. In effect, this rate comprises direct labour costs, administration, facility charges and other direct overheads. Audit New Zealand has also reviewed these charges, ensuring they comply with Public Sector guidelines on Crown Entity charges. The BCA in turn re-invoice the client and this is effectively added to the costs of processing the building consent by the BCA. Conversations with the NZFS Engineering Manager indicate that the DRU accounts for about 30 – 40% of the entire NZFS's annual engineering budget.

As the DRU are involved in reviewing performance based fire engineering designs, the team members hold recognised qualifications in fire engineering. The team is comprised of individuals from New Zealand and from overseas. As all building consent applications received by the DRU must be completed within a statutory 10 day timeframe, all work received is tracked accordingly through an electronic tracking system. Acknowledgement

notifications are sent to the BCA's upon receipt of all building consent documentation. The work is then allocated to an engineer to complete, during which a job sheet is completed and all hours spent completing the work are accounted for. From here a memorandum is completed and this is reviewed prior to being sent to the relevant BCA.

To assist the DRU in their review work, a "*Tier 1 Review Checklist*" has been developed by the engineering team. This allows the reviewing engineer to process the design work in a logical manner and in addition, provides the engineer with a record of all notes and comments relating to that particular piece of work. This document is then stored with all of the other documentation created for this consent. This checklist can be seen in Appendix 2.

During the course of conducting its work, the DRU engineers do not engage in discussions or conversations with the design community. The correspondence remains solely between the DRU and the BCA. Conversations with the NZFS National Director Fire Risk Management confirmed that the nature of the advice provided by the DRU is independent, prepared for the BCA's in support of a statutory provision and its content therefore, is not subject to consultation with the applicant. In addition, the Building Act makes if clear that all documentation submitted in support of an application for building consent must be complete and must demonstrate compliance with the Building Code. Feedback from the fire industry questionnaire highlights that members of the design community feel unhappy with this situation and feel that dialogue between the DRU and the designer is warranted in order to aid the building consent process.

6.1 The design process

Although the DRU does not engage in dialogue with the design community during the course of reviewing building consent applications, the NZFS regional fire engineers engage with the designers and BCA's at the pre building consent stage of the building process. In line with the IFEG, this involvement entails attending fire engineering briefs with the intent of creating a final fire engineering design brief. NZFS involvement at this stage involves assisting with the establishment of acceptance criteria and input into facilities and systems proposed for buildings that will entail NZFS use. In addition, these meetings may incorporate additional NZFS staff such as regional Fire Safety Officers as well as operational personnel. Of note

here is that the involvement of the NZFS in this process occurs prior to the designer commencing the detailed design phase of the project. Figure 6.1 below highlights the design process of a building and the relevant stages where the NZFS are involved. The areas highlighted in red show the key parts in the design process where involvement of NZFS staff occurs.

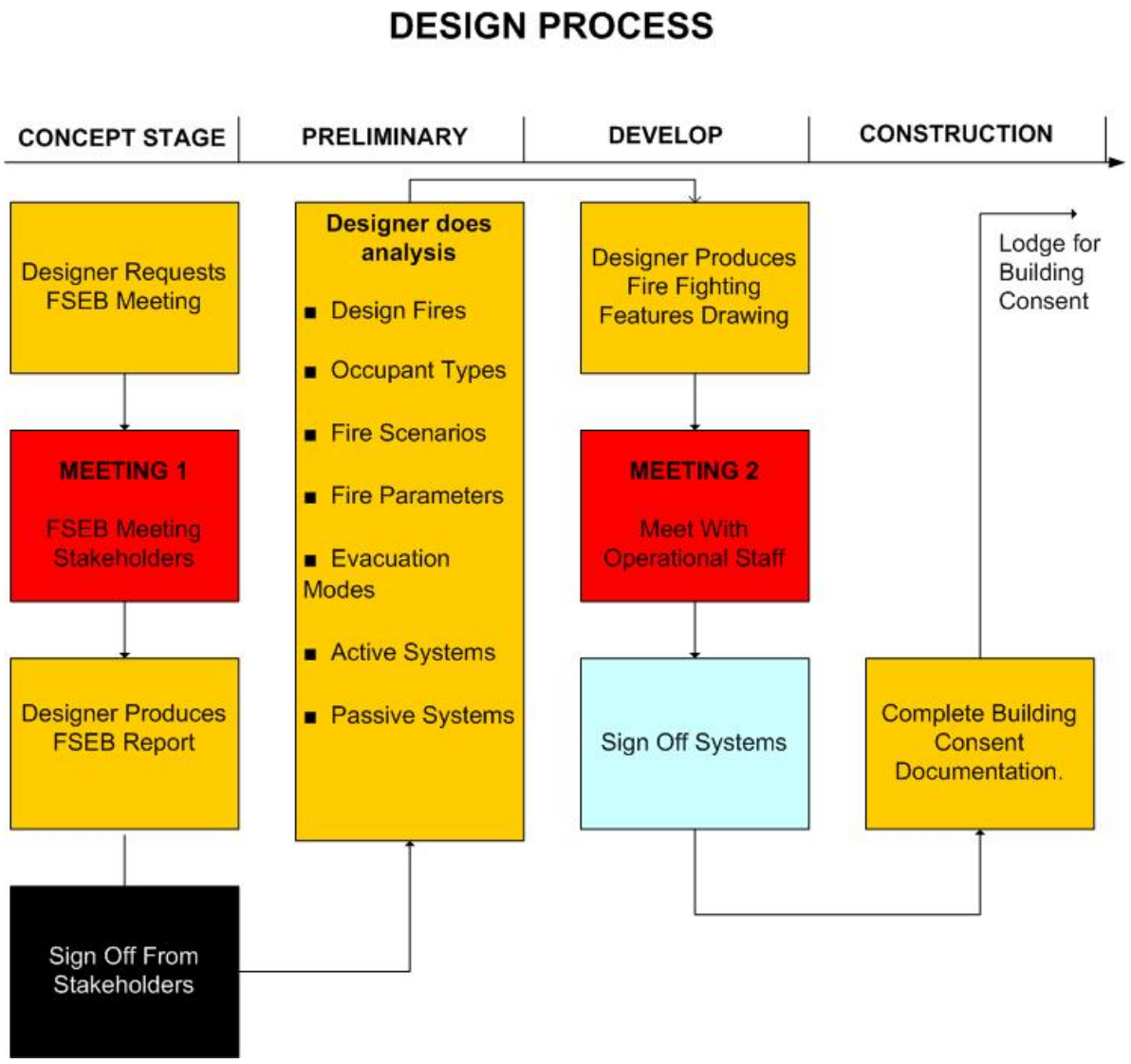


Figure 6.1: Involvement of the NZFS in the building design process prior to building consent application[10]

The IFEG provides a robust process for building design, an outcome of which is the fire engineering brief (FEB) referred to in meeting 1 in Figure 6.1 above. This document is then agreed to by all stakeholders. This document varies in size depending upon the size of the building project and may simply entail an email trail highlighting the agreement of all

stakeholders for small, non-complex building projects. Figure 6.2 below shows the areas for consideration prior to the formulation of a fire engineering brief.

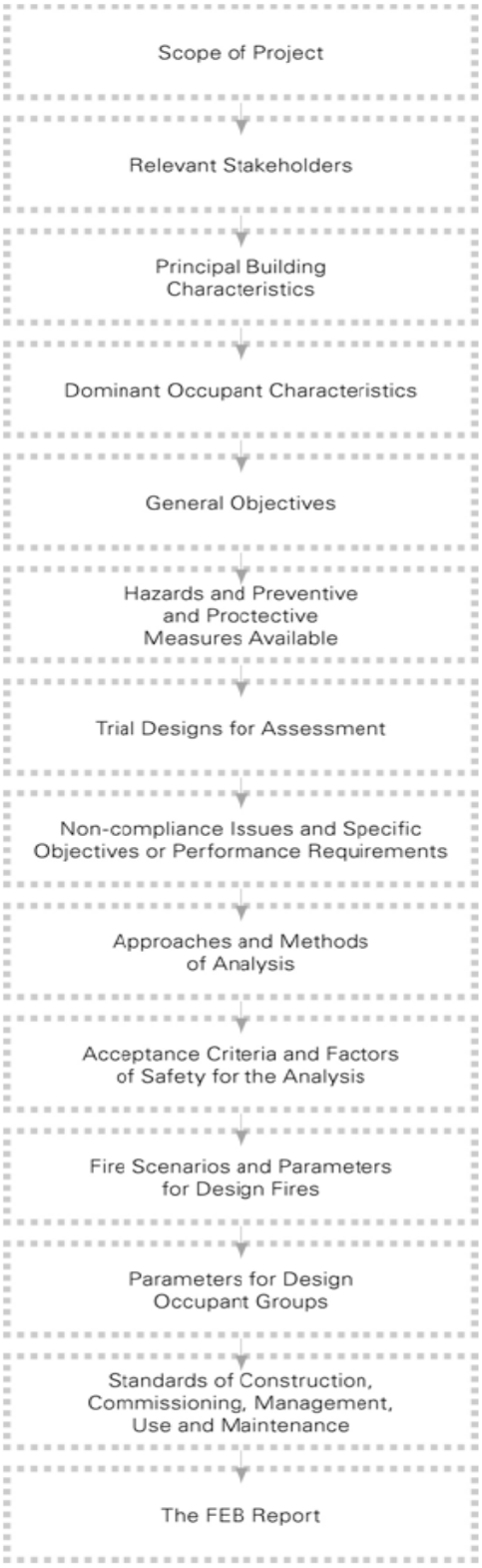


Figure6.2: Areas for consideration prior to the formulation of a fire engineering brief

To support the involvement of NZFS staff and the DRU in the design and building consent process review process further, additional guidance has been developed by the NZFS engineering team. One piece of guidance documentation developed is the FEB meeting check sheet. This was developed to assist the local NZFS engineers in the FEB process in advance of attending a FEB meeting. In doing so, this allows all key information regarding a building's design and expected operation to be identified as early in the design process as possible. In addition, it also maximises the time spent at FEB meetings in ascertaining key design aspects of relevance to each stakeholder. This serves to ensure all relevant aspects of the building deign have been discussed and in doing so will assist in minimising the time taken once the building consent application has been lodged. Once completed, this document serves as a record of the key points for discussion at the FEB meeting and is filed alongside all other documentation relating to that building project. This check sheet can be seen in Appendix 3.

The fire engineering team have also developed a Firefighting Facilities Checklist. This checklist was created to assist building designers to address relevant firefighting aspects with local region representatives prior to a building consent application being lodged. The checklist is a document utilized by the local NZFS Chief Fire Officer or their nominated person as a guide to check the firefighting features provided. It was envisaged that by designers utilising this document, it would assist in speeding up the time with which the design was being reviewed by the DRU. In addition, time savings could also be made in the overall consent process, signed off and a record of the checklist included in the documentation for building consent. The firefighting facilities checklist can be seen in Appendix 4.

Of note also is the "Guide to Fire Service Operations in Buildings" document that has been developed by the fire engineering team. Part 8 of the compliance documents (C/AS1), refer to access and facilities for the NZFS. However, as these documents have limited information regarding firefighting access and equipment, the NZFS have developed an industry guide to assist those in the building industry gain further information about how the NZFS interacts with buildings and also its recommendations to designers working on design projects. This document is available from the NZFS website[10].

7 AUDIT OF THE DRU

In mid 2006, one year after the DRU began operating, two independent audits were commissioned by the NZFS. The principal aim in commissioning these audits was to provide assurance to the Commission and the Minister of Internal Affairs that the DRU was carrying out its duties in a technically competent and accurate manner. In addition, as part of this audit process, the auditors were also asked to provide comment on the quality of the fire engineering reports received by the DRU. This was requested as in order to comprehensively audit the advice provided by the DRU, it was necessary to review this advice in the context of the quality of the building consent applications received by them. The audits were carried out by Warrington Fire Research, Melbourne, Australia[11] and by the Centre for Environmental Safety and Risk Engineering (CESARE), Victoria University, Melbourne, Australia[12]. It must also be noted that the audits undertaken constituted a technical review and were not a formal peer-review.

In carrying out this audit, the auditors each reviewed 5% of the building consent applications that had been received by the DRU at that time. This accounted for 26 building projects each. The NZFS had no influence of the choice of projects selected by the auditors, but simply requested that a range of building projects be looked at. In selecting the type of building projects, the auditors did so in a way so as to gain as wide a cross section of buildings, designers and DRU reviewers as possible. For each of the building files held by the DRU that were selected for audit, the contents included the documentation supplied to the DRU by the BCA, the memorandum issues to the BCA by the DRU and any DRU internal documents such as checklists etc.

Following completion of the audits the findings were made aware to the Commission, the Department of Building and Housing and Local Government New Zealand. In addition, the reports were forwarded to the Institution of Professional Engineers of New Zealand (IPENZ) with a request that they be considered by a fire engineering that had been set up to look at the practice of fire engineering in New Zealand.

7.1 Audit evaluation sheet summary - CESARE

Figure 4 below highlights the audit evaluation sheet summary provided by CESARE. The summary splits the overall feedback into that of the engineering reports audited, with the second highlighting the feedback following the audit of the DRU work. The summary rates the work reviewed across a scale of poor to very good and the figures placed under each relate to the percentage of reports that fell into that category in the view of the auditor. The engineering reports summary highlights three main areas – formal fire engineering process, acceptance criteria and the engineering methods used by the designer. The results highlight that a very small percentage of the engineering reports reviewed were rated as being acceptable. No engineering reports were rated as good or very good with the majority of the engineering reports falling within the incomplete and poor categories. In 100% of cases, an identified and followed formal fire engineering design process fell within the incomplete and poor categories. 90% of engineering reports fell within the incomplete and poor ratings for specifying acceptance criteria in their designs, with a poor rating in 100% of reports when the acceptance criteria were assessed on whether the criteria outlined were viewed as comprehensive.

90% of engineering reports fell within the incomplete and poor categories when the engineering methods used in the reports were assessed against whether they were appropriate and technically correct. The conclusions category highlights that overall 90% of the fire engineering reports audited fell into the incomplete and poor ratings.

Engineering Reports		Percentage of reports				
		Poor	Incomplete	Acceptable	Good	Very Good
Formal fire engineering design process	*Identified*	70	30			
	Followed	90	10			
Acceptance criteria	*Specified*	70	20	10		
	Comprehensive	100				
Engineering methods used	*Appropriate*	50	40	10		
	Technically correct					
Conclusions	*Clear*	70	20	10		
	Substantiated	70	20	10		
		Each line adds up to 100%				

Design Review Unit Memos	Percentage of reports				
	Poor	Incomplete	Acceptable	Good	Very Good
Legal Background specified			20	80	
Well presented format			10	90	
Technically accurate			20	80	
Information actionable			100		
	Each line adds up to 100%				

Figure 7.1: Audit evaluation sheet summary[12]

The audit of the DRU work presented the findings against four criteria as outlined above. The results highlight that of the four categories the work of the DRU was assessed against, all reports fell within the acceptable and good categories. Of note are the results obtained for whether the work carried out is technically accurate and also whether the information is actionable. The results confirm that the work of the DRU is technically accurate in 80% of cases, with the remaining 20% being viewed as acceptable. The actionable information was determined as acceptable in 100% of cases. No criteria in the audit conducted by CESARE rated either the DRU work or that of the engineering reports in the very good category.

7.2 Audit evaluation sheet summary – Warrington Fire Research

Figure 5 below highlights the audit evaluation sheet summary provided by Warrington Fire Research and assess the DRU work and fire engineering design reports against the same criteria as that of CESARE. The results highlight some differences in the expression of

findings compared with those of CESARE. In regard to whether the work of the DRU is technically accurate, this was classed as acceptable in 62% of cases, with 38% of cases falling within the incomplete category. Although the information actionable is regarded a being acceptable in 47% of cases, 53% fell within the incomplete and poor categories. Overall, the percentage ratings applied to the DRU work audited by Warrington research, show lower values than that of CESARE.

The results of the audit of the fire engineering reports by Warrington Fire Research highlight that 87% of engineering reports fell within the acceptable and good categories when assessed against whether a formal fire engineering design process had been identified. However, in then assessing whether a formal fire engineering process had actually been followed, 92% of engineering reports fell within the incomplete and poor categories. 59% of reports were regarded as acceptable and good when they were reviewed as to whether acceptance criteria were specified. However, 59% of reports were audited as incomplete or poor when acceptance criteria were assessed against being comprehensive or otherwise.

Of note in the results highlighted by Warrington Fire Research are those highlighted for whether the engineering methods used in the engineering reports were appropriate and technically correct. The results show that 92% were regarded as being incomplete and poor, with only 8% of reports audited considered as acceptable. When how clear the conclusions reached in the engineering reports were audited, 69% of reports audited by Warrington Fire Research fell within the acceptable and good categories, with only 8% considered as very good. When these conclusions were then audited for whether they were substantiated or not, 81% fell into the incomplete and poor categories.

DRU MEMORANDUMS	Percentage of reports				
	Poor	Incomplete	Acceptable	Good	Very Good
Assessment Background	41%	0%	59%	n/a	n/a
Well presented format	n/a	n/a	100%	n/a	n/a
Technically accurate	0%	38%	62%	n/a	n/a
Information actionable	15%	38%	47%	n/a	n/a

ENGINEERING REPORTS		Percentage of reports				
		Poor	Incomplete	Acceptable	Good	Very Good
Formal fire engineering design process	*Identified*	4%	8%	83%	4%	0%
	Followed	29%	63%	8%	0%	0%
Acceptance criteria	*Specified*	13%	21%	42%	17%	8%
	Comprehensive	21%	38%	42%	0%	0%
Engineering methods used	*Appropriate & Technically correct*	17%	75%	8%	0%	0%
Conclusions	*Clear*	4%	19%	50%	19%	8%
	Substantiated	4%	77%	12%	8%	0%

Figure 7.2: Audit evaluation sheet summary[11]

7.3 Improvements for consideration following the audit process

The results highlighted in the audit reports present some opportunities for enhancement within the overall building consent process. Suggestions for improvement included:

- That the DRU adopt a more holistic approach is assessing performance based designs
- the adoption of *IPENZ Practice Note 2*[13] as the basis for carrying out its role under Section 47 of the Building Act 2004
- the DRU should endeavour to participate in the fire engineering brief process
- DRU to set minimum benchmarks to determine the appropriate quality of fire engineering submissions
- DRU to recommend to the Department of Building and Housing that appropriate guidance notes be developed for fire engineering practitioners and

BCA's relating to the format and levels of information contained within performance based design work, utilising "reasonably practicable" in design work submitted to the DRU and in undertaking performance based fire engineering design work

- DRU to demonstrate less reliance on the Acceptable Solutions and to support performance based design further by providing advice on the criteria used in assessments as well as design on suitable design data and methods.

The content of the audit reports in relation to the fire engineering design community and the standard of fire engineering reports being sent to the BCA's in support of a building consent application is indeed worrying. In addition to suggestions for improved guidance within the building consent and design process, the audit reports were critical of specific items contained within the fire engineering reports. These included:

- In the view of CESARE, no report audited constituted an adequate fire engineering report, with the authors failing to adequately assess the potential hazards of fire, failure to understand the behaviour and involvement of building occupants in initiating and dealing with fire, and to adequately assess the range of possible fires that could occur in the building
- many of the reports submitted for building consent contained no engineering analysis at all
- many of the reports used "expert judgement" to justify claims made in the report with no factual basis for doing so
- computer modelling was not fully explained nor justified in many of the cases where it as included in the report
- documentation supplied by the designer for building consent should cover the entire building an not just an individual portion
- design work claiming to be an acceptable solution, should be entirely in accordance with them. Any departure then constitutes complete fire engineering analysis and reporting.

The BCA's have also been identified in the audits as having some opportunities in regards to their position within the industry and the building consent process. These included:

- Improved assessments of applications for building consent prior to being forwarded to the DRU. Many should not have been forwarded to the DRU due to inadequate documentation. In addition, many of these cases reviewed by the auditors were identified as cases where a competent BCA could review the application themselves and did not need the involvement of the DRU
- improved advice to BCA's on the interpretation of the criteria used to assess whether a building consent application should be forwarded to the DRU
- cases where additional information has been identified as needed by the DRU, that the BCA resubmit the consent application to the DRU once this information has been provided from the applicant
- feedback is given to the DRU on the actions taken by the BCA in response to the advice received by the in their memoranda

Overall the feedback with regard to the work being carried out by the DRU is seen as positive and the audit reports convey a confidence that that DRU is discharging their responsibilities under the Building Act 2004 effectively and accurately. Notwithstanding this however, the audit reports concluded that the quality of the submissions received by the DRU was generally poor and felt a strong case exists for an improved standard of fire engineering reporting. The audit also highlighted a consistent use of "expert judgement" in the cases reviewed, where little or no documentation was provided to support such claims. It was highlighted that the DRU should be less "wedded" to the compliance documents and could by leadership and example, encourage better standards of fire engineering design and documentation. Improved assessment of building consent applications by the BCA's was cited as a key component within the building consent application process. With BCA's taking a more proactive role in these tasks, the benefits of the feedback received by them from the DRU will se greater improvement and assist the building consent process in a more positive manner.

8 REVIEW OF QUALIFICATIONS AND PROFESSIONAL ASSOCIATIONS

The results of the independent audit reports of the DRU both identified potential issues with the technical content and engineering approaches being used. The reports made no reference as to whether or not the individuals carrying out this work were suitably qualified, or were acting outside of their areas of expertise. Although this was the case, it is assumed that such work was not part of the overall brief. As such, it was possible therefore that the reports where negative comments were stated by the auditors, were written by individuals who were not qualified to carry out this work and were therefore working outside their area of expertise and competency. It is also noted that no formal limitations exist in New Zealand to prevent non-formally qualified individuals from operating as a fire engineering practitioner.

With this in mind, a review took place by the author, of designers whose design reports were subject to the DRU audit. This review aimed at putting some further context to the outcomes of the audit reports as to the professional qualifications, memberships and associations to technical bodies and organisations of those performing this engineering work. The qualifications and associations to professional bodies looked at were a) whether the individual held a Masters degree in fire engineering (MEFE), b) held membership to the Institution of Professional Engineers of New Zealand (IPENZ), the representative national engineering body in New Zealand, and if so, to what level, c) were members of the New Zealand Chapter of the Society of Fire Protection Engineers (SFPE). In order to ascertain this data, the author reviewed the public registers of both IPENZ and the SFPE in order to obtain correct data at the time of writing. This work did not assess whether the design reports had been peer reviewed prior to being sent to the DRU and therefore, neither were the qualifications and professional memberships of the peer reviewers.

Figure 8.1 below highlights the initial breakdown of audited reports by qualifications and professional memberships of the authors.

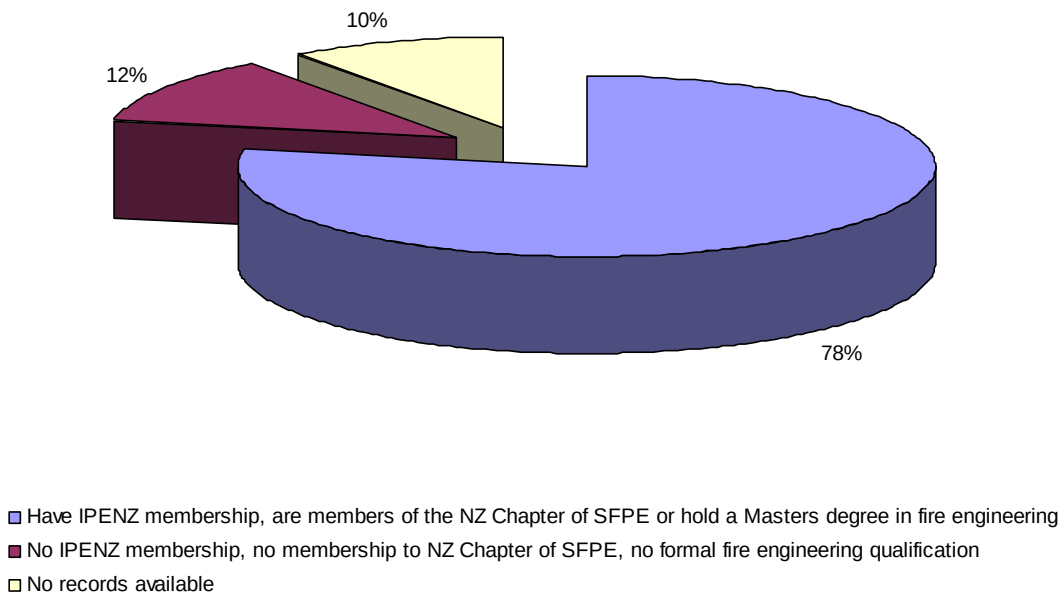


Figure 8.1:Initial breakdown of audited reports by qualifications and professional memberships of the authors

Initial results as highlighted above, showed that of the reports reviewed as part of the audit process, 78% of individuals held either membership of IPENZ, membership to the New` Zealand Chapter of the SFPE, or hold a Masters degree in fire engineering. 12% did not hold any memberships, affiliations nor held a formal fire engineering qualification. No records were available for a further 10%. This was initially surprising given the nature of the content and comments contained in the audit reports and served to highlight that over three quarters of those whose reports were audited have some form of qualification or professional membership to a national and international body.

A breakdown of those who hold a Masters degree in fire engineering (MEFE) was then assessed. The numbers obtained were based on the individuals who gained this qualification through then University of Canterbury, Christchurch. Figure 8.2 below highlights this breakdown.

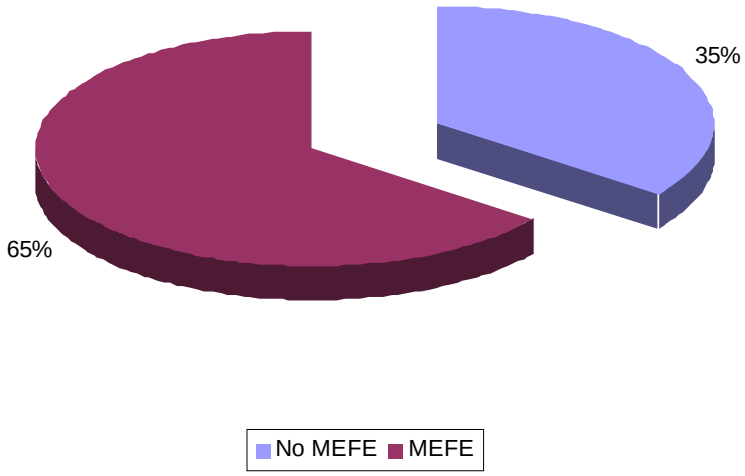


Figure 8.2: Breakdown of audited reports by MEFE qualification of the authors

This result also proved of interest and confirmed that of the design reports reviewed, 65% of the authors held a Masters degree in fire engineering. Although just over one third of authors did not possess this qualification, it was not determined whether or not thy possessed an undergraduate qualification in fire engineering or fire science. This presents a worrying picture. Whilst it is accepted that gaining a Masters degree in fire engineering does not automatically qualify an individual as an expert within the industry, these design reports have still been presented to Council as part of a formal building consent application and whilst the authors are either self-employed or are employees of a professional engineering practice. In the case of the latter, it is expected that these design reports would not have been released until an internal peer review had taken place, such is the nature of professional engineering practice.

Of note also is that those authors who have submitted these design reports to Council, which ultimately have ended up with the DRU, means that they are working in a professional capacity on behalf of the New Zealand public and are undertaking performance based design work. It is arguably more worrying that for the 35% of individuals possessing no formal qualification in fire engineering, there are no restrictions to them carrying out performance based design work in New Zealand currently and therefore they are not prevented from competing commercially with qualified professionals within the marketplace. A breakdown

of those who hold membership to the New Zealand Chapter of the Society of Fire Protection Engineers (SFPE) was then assessed. Figure 8.3 below highlights this breakdown.

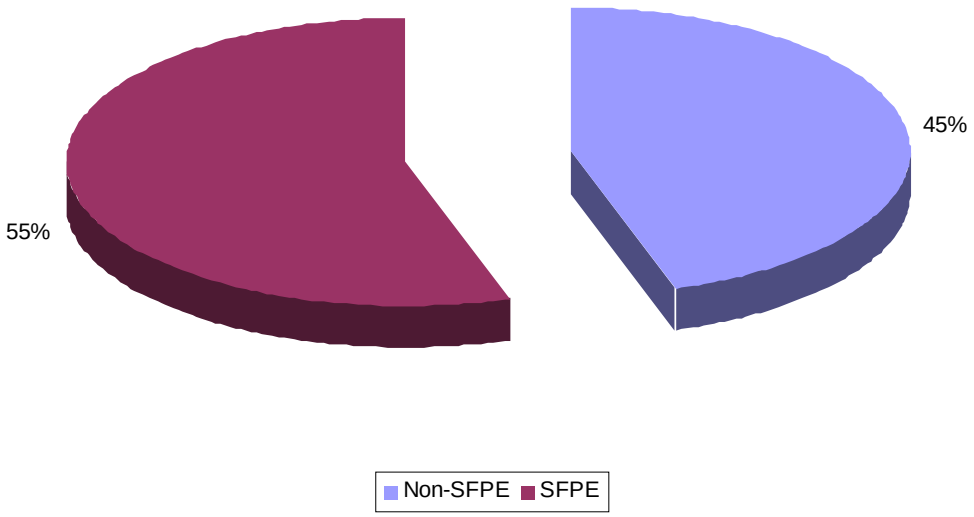


Figure 8.3: Breakdown of audited reports by membership to the NZ Chapter of the SFPE

The results shown above highlight that just over half of the authors of the audited reports hold membership to the New Zealand Chapter of SFPE. It is noted here, however, that gaining local chapter membership in New Zealand does not consist of formal technical assessments or formal examinations. As such, local chapter membership in New Zealand is not a formal qualification. Of the 55% of authors holding membership to the local New Zealand chapter, 36% of those hold membership to SFPE USA, whereby membership is achieved through formal assessment.

A breakdown of those who hold membership to the Institution of Professional Engineers of New Zealand was then assessed. Figure 8.4 below highlights this breakdown.

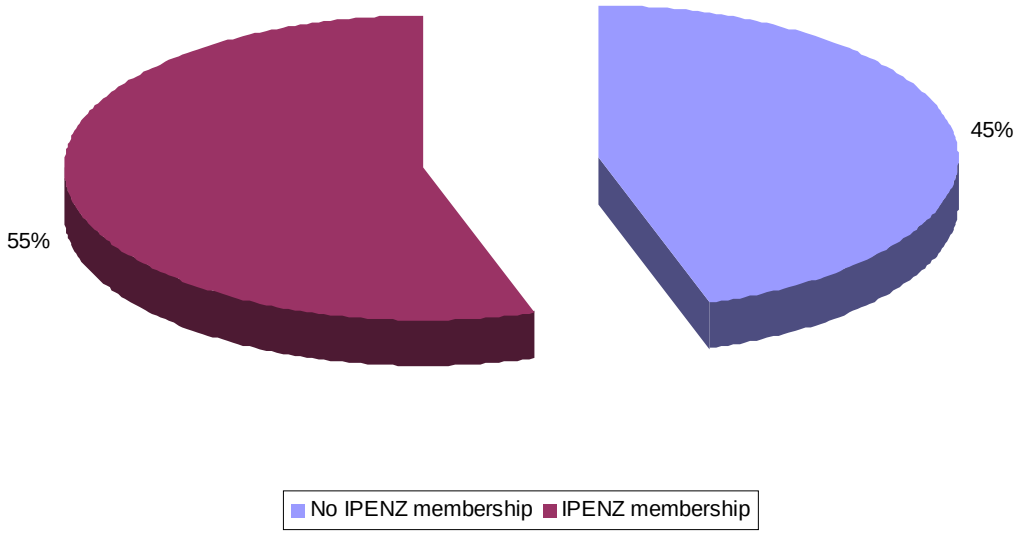


Figure 8.4: Breakdown of audited reports by whether the authors hold membership to IPENZ

Although not a mandatory requirement, membership of IPENZ as the national representative body for professional engineers is encouraged within the industry in New Zealand. The results of Figure 9 above show that of the audited reports, just over half (55%) of the authors held membership to IPENZ, whilst 45% did not. Within IPENZ, there are eight membership classes and each class has its own separate requirements should an individual wish to seek membership of that class. Membership classes include - Professional Member (MIPENZ), Fellow(FIPENZ) or Distinguished Fellow (Dist FIPENZ), Technical Member (previously Engineering Technologist) (TIPENZ), Associate Member (previously Engineering Associate) (AIPENZ), Graduate Members (GIPENZ), Companions (Comp IPENZ), Affiliate and Student Members[14]. To more accurately assess the levels of IPENZ membership, the audit reports were then broken down by the author's relevant IPENZ membership. Figure 8.5 below highlights this breakdown.

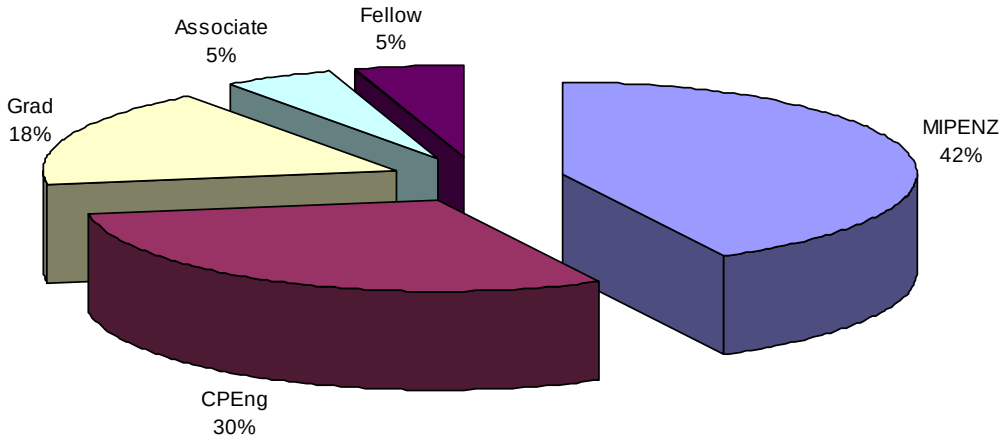


Figure 8.5: Breakdown of the IPENZ membership of the report authors

In all, MIPENZ accounted for the highest membership percentage at 42%. Chartered Professional Engineer was the next highest membership represented at 30%. The remaining memberships represented were Graduate at 18%, Associate and Fellow both of which represented 5% of authors. It is interesting to note in the context of the audit report findings that of the membership classes represented above, only Graduate membership does not require the individual to undergo an IPENZ competency assessment to reach that class of professional membership[14].

Although Figure 8.5 above highlights those with IPENZ membership, it must be noted that Fellows and those with CPEng may also be MIPENZ. This was not taken into account when representing the data, but is further discussed below. In the same manner, those with MIPENZ are those who do not hold CPEng nor are Fellows.

In addition to the breakdowns outlined above, most authors of the audited reports held a combination of professional memberships and qualifications. Reflecting this situation is important as it provides necessary context to the overall professional memberships and qualifications of the authors whose reports were audited. The Venn diagram below therefore, reflects the overall breakdown of the report authors as to whether they hold IPENZ

membership, are members of the New Zealand Chapter of the SFPE, or hold a Masters degree in fire engineering.

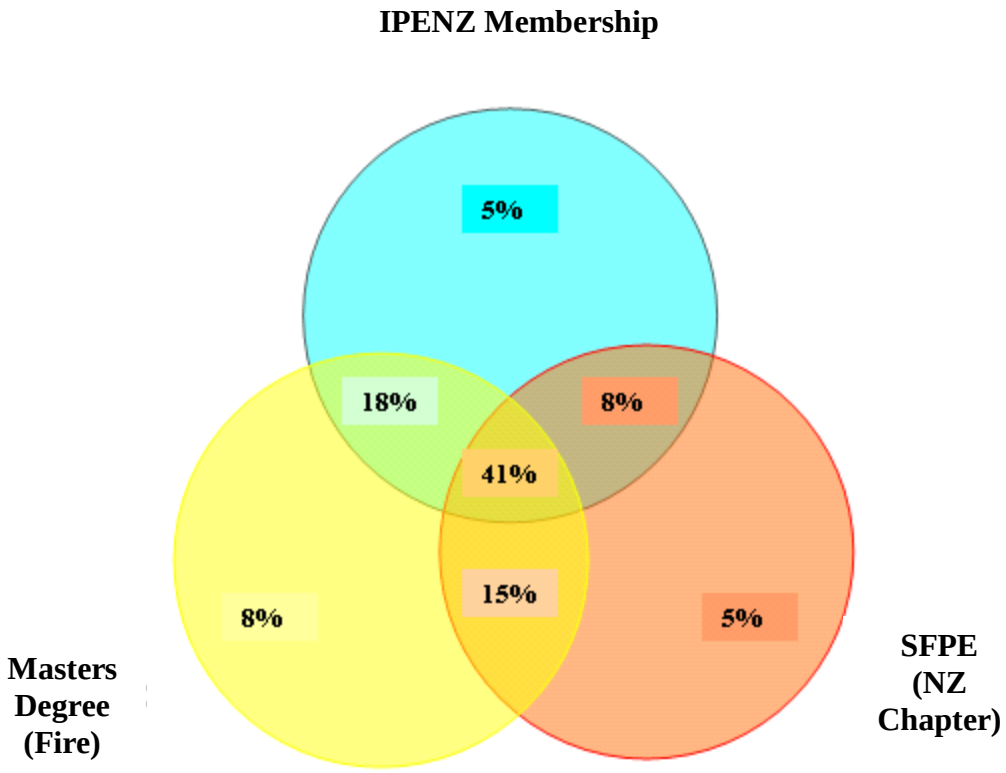


Figure 8.6: Breakdown of all audited report authors holding professional memberships and a Masters degree in fire engineering

Results highlighted above represent 78% of the authors whose reports were audited. Where each circle represents a qualification or professional membership, the sum of the percentages within it is not 100%. This is due to the fact that the Venn diagram itself represents the 100% figure i.e. the union set. Therefore looking at the percentages of each of the circles (or sets of data) above individually, does not give the actual percentage breakdown of that set. For that to occur, each set must me reviewed individually. This was not looked at as part of this report.

The results above highlight that very few of the authors whose reports formed part of the DRU audit, do not hold a combination of IPENZ membership, SFPE New Zealand chapter

membership or a Masters degree in fire engineering. Of note is that 41% of those represented above hold a Masters degree as well as IPENZ and SFPE membership. 18% of authors hold both IPENZ membership as well as a Masters degree in fire engineering. 15% hold a Masters degree in fire engineering as well as membership to the New Zealand chapter of the SFPE. 8% of report authors hold IPENZ and SFPE membership but did not hold a Masters degree in fire engineering. Of those that held only one of the above, 8% hold only a Masters degree in fire engineering, whilst 5% of authors hold only IPENZ membership or only SFPE membership.

12% of the overall total did not hold any of the memberships or qualification referred to in Figure 8.6 above. This is of serious concern as this highlights that performance based design work is being carried out by individuals with no formal qualifications in fire engineering nor are they represented by any professional engineering or technical body. In addition, there are currently no restrictions in New Zealand to prevent this practice from occurring. The majority (65%) of those designs reviewed under the DRU audit process were completed by professionally qualified individuals (Masters Degree in fire engineering) with over half being affiliated to IPENZ and also holding SFPE membership. This presents a worrying situation with a high percentage of individuals formally qualified and holding professional memberships to national and international bodies.

In addition, individuals holding a membership classification to MIPENZ would have had to undergo a competency assessment to reach that professional membership class. That being said, the competency assessment may not have been related to fire engineering, but may have been related to their primary area of undergraduate qualification and experience. New Zealand therefore, does not currently have restrictions in the building consent process to ensure that performance based design work is completed by suitably qualified and experienced individuals.

9 BUILDING CONSENTS RECEIVED BY THE DRU

April 2005 saw the beginning of a process in New Zealand that provided for the NZFS to have a legislative role within the Building Act and begin to provide formal advice to BCA's about certain aspects of building consent applications prior to the issuing of consent. At the time of writing, the DRU had been operating for 45 months and had provided in excess of 2,700 memoranda to the 75 BCA's across New Zealand.

One of the objectives of this work was to see whether the changes brought about by the Building Act 2004 had any impact on the levels of performance-based design being carried out in New Zealand. To determine whether this can be said with any certainty or not, one of the areas looked at was the data collected by the DRU regarding the numbers of building consents received from BCA's and to begin to monitor any obvious trends. This was done initially on a national basis and in addition, the three main centres of Auckland, Wellington and Christchurch were also looked at. The findings of this are outlined below. The raw data used to compile the results below was supplied through Statistics New Zealand and the New Zealand Fire Service engineering database. Relevant data was then analysed and extracted to portray the results shown below.

9.1 National consent numbers

Figure 9.1 below highlights the national monthly trend of the consents received by the DRU from all of the BCA's throughout New Zealand. This figure shows that an overall downward trend in the number of consents received occurred quite sharply throughout 2005, following the inception of the DRU in April of that year. Early 2006 saw a gain in growth but for the remainder of the year an overall downward trend continues to the lowest numbers received by the DRU in February 2007. March 2007 saw the highest number of consents received since the DRU began operating, whereby 77 consents were received. Following a drop off the following month, the numbers of consents for the remainder of 2007 showed overall positive growth until a decline at the end of the year. 2008 saw a very gradual increase and consistent number of consents with a much less evident trend compared with previous months.

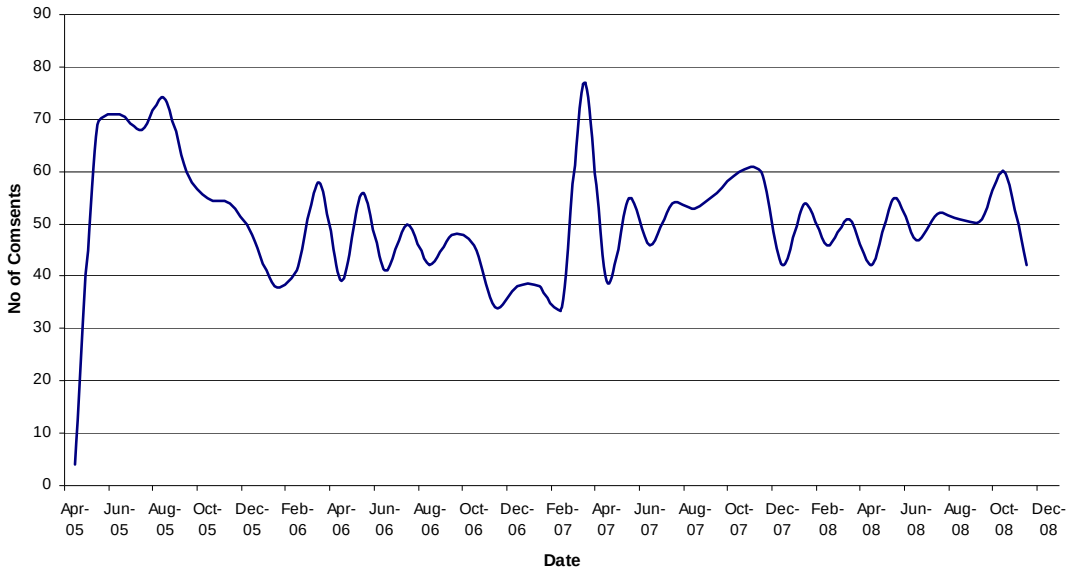


Figure 9.1: Monthly DRU consents trend - Nationally

Table 9.1 below identifies the monthly breakdown of the total number of consents received by the DRU since it began operating in April 2005. A graphical representation of this data can be seen in Figure 9.2 below. The data highlights that March appears to show a consistent increase in the numbers of consents the DRU receives for each of the last three years. This is followed by a gradual increase in consent numbers through to September with an overall decline in numbers evident from the beginning of the last quarter of each year. It is believed that this could be due to a decline in the amount of new work commencing prior to the Christmas and holiday break, with the first quarter of each year showing a positive growth pattern as a new work cycle begins.

The total number of building consents received by the DRU in 2005 is seen to be the lowest of each of the years since it began. That being said, however, the DRU began operating in April of that year. In addition though, 2005 saw the highest average monthly number of consents received by the DRU than any of the years since, with a monthly average of 56 consents. The total numbers of yearly consents increased in 2006 with 2007 seeing the highest yearly total since the DRU began. Although this was the case, 2006 saw a decrease in the monthly average figure, increasing again in 2007. The monthly average figure for 2008 was one consent lower than the previous year, however, at the time of writing no data was

available for the month of December. Figure 9.2 below highlights the national yearly totals of the consents received by the DRU.

Table 9.1*: Monthly breakdown of the total number of consents received by the DRU since it began operating in April 2005*

2005 Consents		2006 Consents		2007 consents		2008 Consents	
Jan		Jan	38	Jan	38	Jan	54
Feb		Feb	41	Feb	34	Feb	46
March		March	58	March	77	March	51
April	4	April	39	April	39	April	42
May	69	May	56	May	55	May	55
June	71	June	41	June	46	June	47
July	68	July	60	July	54	July	52
August	74	August	42	August	53	August	51
September	60	September	48	September	56	September	51
October	55	October	46	October	60	October	60
November	54	November	34	November	60	November	42
December	48	December	38	December	42	December	
Total	**503**		**541**		**614**		**551**
Average/Month	**56**		**45**		**51**		**50**

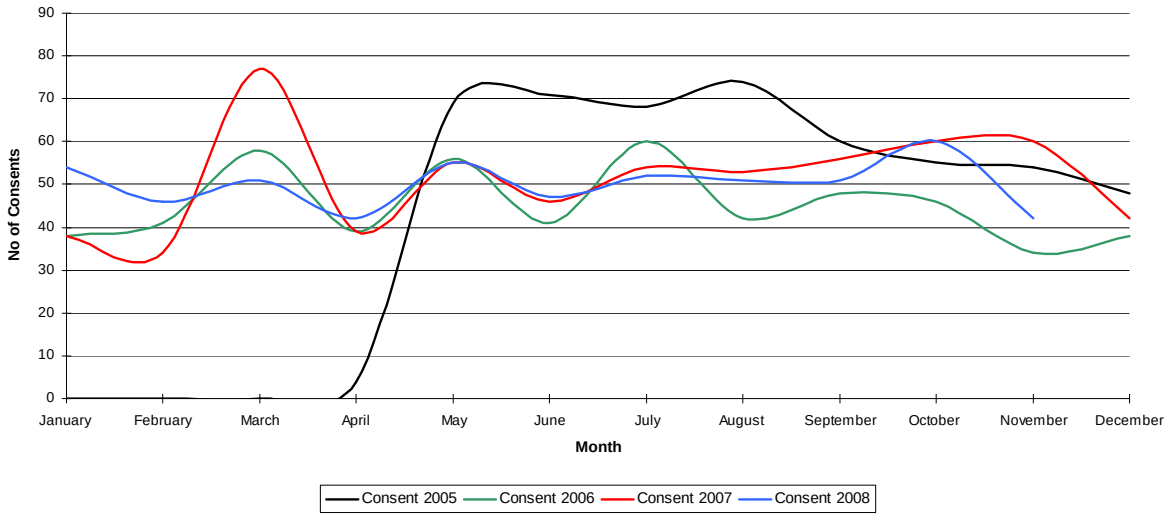


Figure 9.2: DRU yearly consent numbers comparison

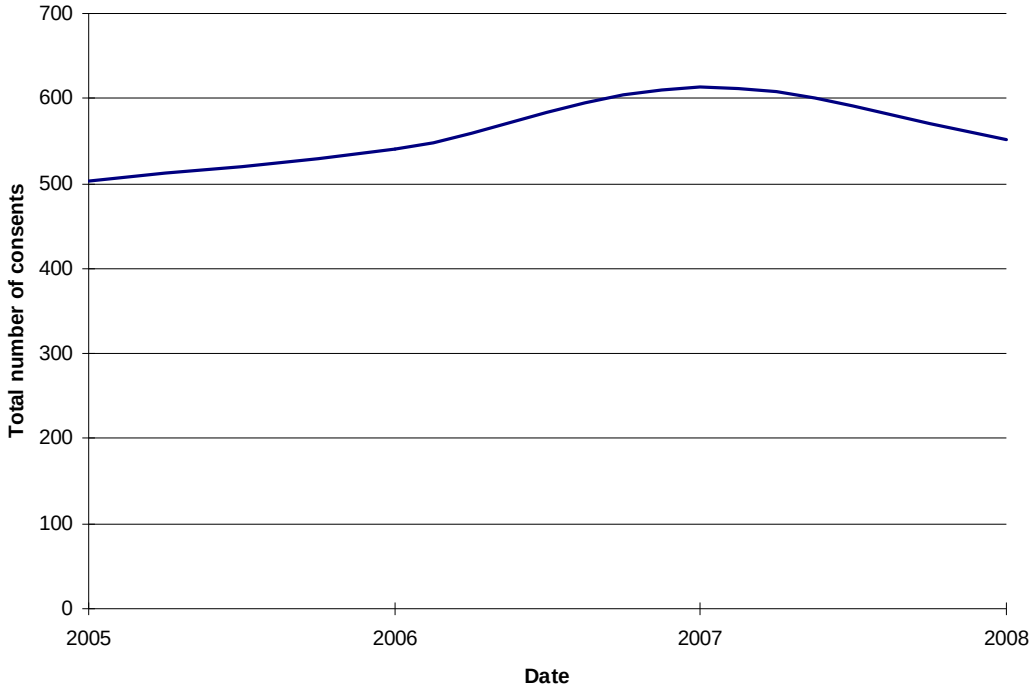


Figure 9.3: Comparison of the total annual consent numbers received by the DRU

9.2 Auckland, Wellington and Christchurch consents

Figure 9.4 below shows the monthly trend for the building consents received by the DRU from Auckland City Council. The results highlight an overall downward monthly trend from when the DRU first began to operate in April 2005. From this date, a sharp decrease in the number of consents being received by the DRU per month is evident throughout 2005. This trend recovered slightly in the last quarter of the year. The first quarter of 2006 saw a declining trend, with this then reversing to show an overall growth period in consent numbers through to July. A sharp decrease is again seen for the remainder of the year until February 2007. Although an short growth period is then seen, a sharp decline in numbers is seen in the second quarter of 2007 to the lowest monthly number seen to date. 2008 recovers slightly, however, the monthly totals are visibly down on previous years.

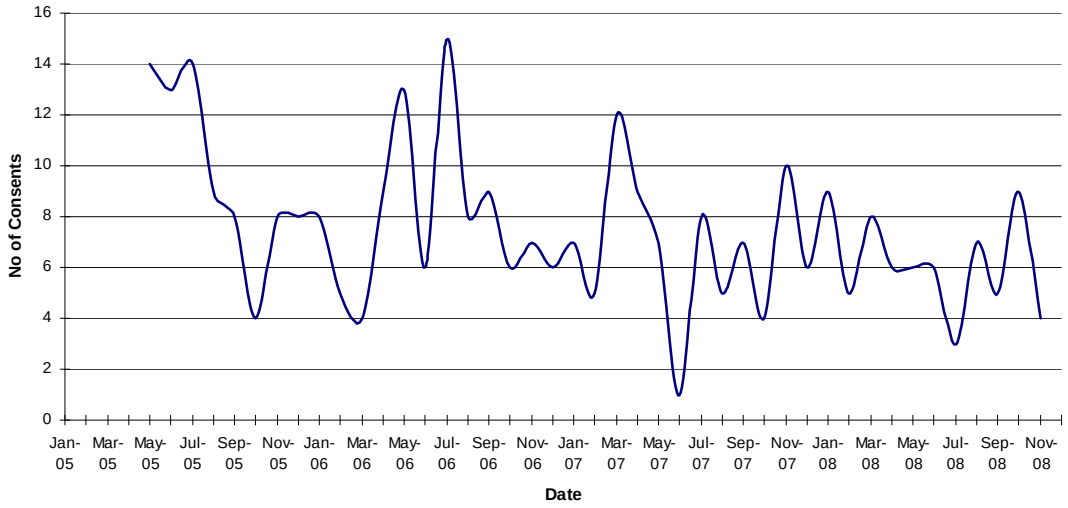


Figure 9.4: DRU consent numbers received from Auckland City Council

Table 9.2 below identifies the monthly breakdown of the total number of consents received by the DRU from Auckland City Council since April 2005. A graphical representation of this data can be seen in below it in Figure 9.5. The data highlights that when looking at the overall total yearly numbers of consents received by the DRU, there is a declining number for the last three consecutive years. Not surprisingly, the average monthly number of consents also follows this declining trend. The numbers of consents received by the DRU shows a decline during the end of the last quarter of each year and the beginning of the first quarter. This reflects the national trend. At the time of writing, no data was available for December 2008.

Table 9.2: Monthly breakdown of the total number of consents received by the DRU from Auckland City Council

2005 consents		**2006 Consents**		**2007 consents**		**2008 consents**	
Jan		Jan	8	Jan	7	Jan	9
Feb		Feb	5	Feb	5	Feb	5
March		March	4	March	12	March	8
April		April	9	April	9	April	6
May	14	May	13	May	7	May	6
June	13	June	6	June	1	June	6
July	14	July	15	July	8	July	3
August	9	August	8	August	5	August	7
September	8	September	9	September	7	September	5
October	4	October	6	October	4	October	9
November	8	November	7	November	10	November	4
December	8	December	6	December	6	December	
Total	**78**		**96**		**81**		**68**
Average/Month	**10**		**8**		**7**		**6**

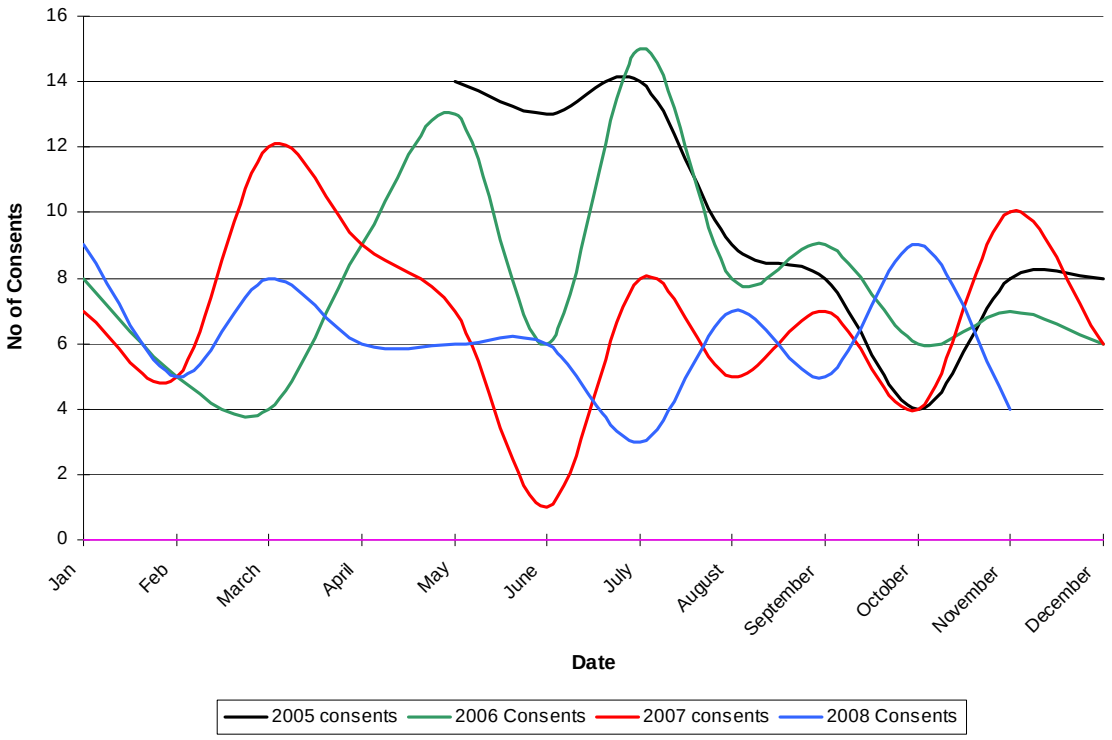


Figure 9.5: Yearly consent number comparisons for consents received from Auckland City Council

Figure 9.6: below shows the monthly trend for the building consents received by the DRU from Wellington City Council. As per the national and Auckland trends seen previously, the 2005 consent numbers received from Wellington City Council also show a decline throughout 2005, although some initial growth is evident from May through to August. This decline continues through the first half of 2006. The remaining months of 2006 show an increase in numbers but as per the national and Auckland figures, then show a decline through to the end of the year. The first quarter of 2007 shows quite consistent growth through to the maximum number recorded to date along with that seen in August 2005. Slowed growth is then seen through to May 2008, whereby an overall decline in consent numbers is seen through to the end of the year.

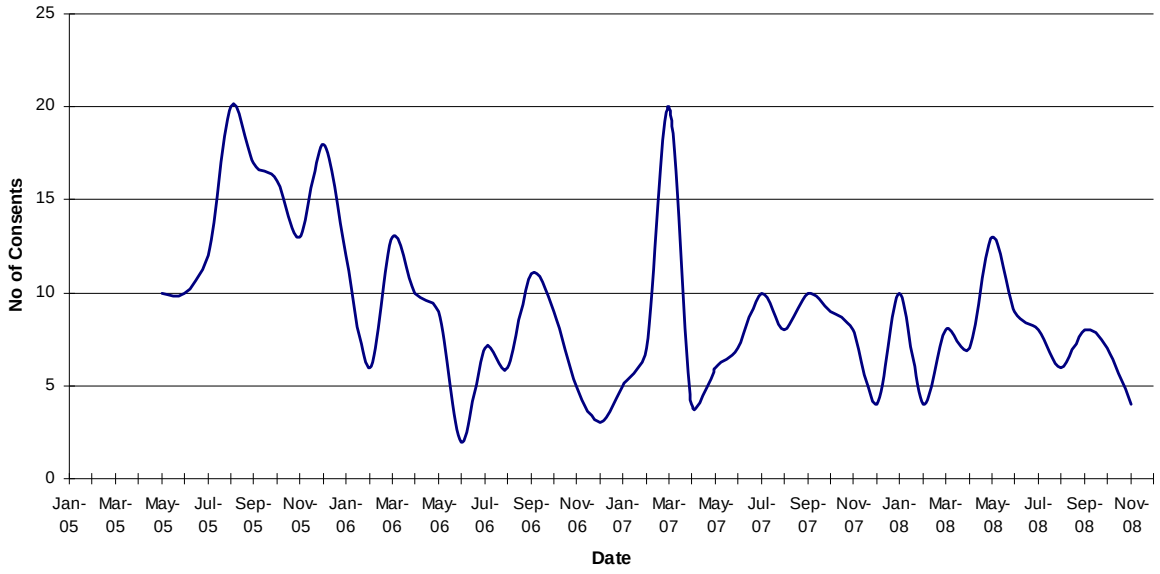


Figure 9.1: DRU consent numbers received from Wellington City Council

Table 9.3 below identifies the monthly breakdown of the total number of consents received by the DRU from Wellington City Council since April 2005. A graphical representation of this data can be seen in below it in Figure 9.7. Each year with the exception of 2005, a decline is seen in consent numbers in the last quarter of the year. This is followed in the first quarter of each year by a growth period through to March. An overall downward trend in the yearly totals for Wellington is evident and this resembles that of Auckland seen above. The total number of consents for 2007 was slightly up on the previous year but not by any real significance. The monthly consent number averages, however, do not follow this overall downward trend and they fall by nearly half from those in 2005, remaining constant at that average since that time.

Table 9.3: Monthly breakdown of the total number of consents received by the DRU from Wellington City Council

2005 consents		2006 Consents		2007 consents		2008 consents	
Jan		Jan	12	Jan	5	Jan	10
Feb		Feb	6	Feb	7	Feb	4
March		March	13	March	20	March	8
April		April	10	April	4	April	7
May	10	May	9	May	6	May	13
June	10	June	2	June	7	June	9
July	12	July	7	July	10	July	8
August	20	August	6	August	8	August	6
September	17	September	11	September	10	September	8
October	16	October	9	October	9	October	7
November	13	November	5	November	8	November	4
December	18	December	3	December	4	December	
Total	**116**		**93**		**98**		**84**
Average/Month	**15**		**8**		**8**		**8**

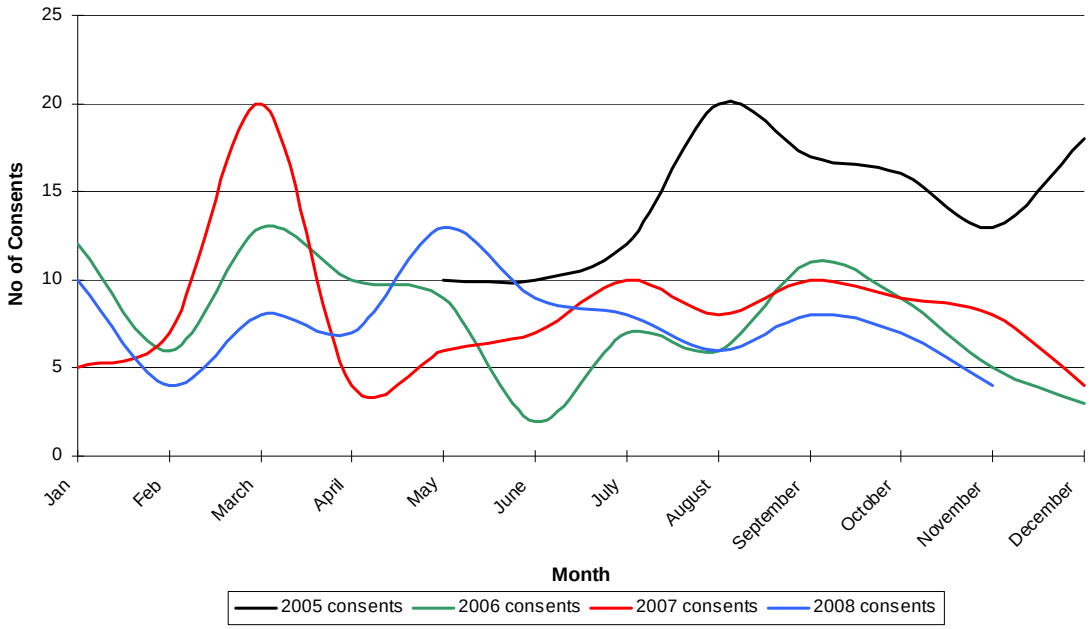


Figure 9.7: Yearly consent number comparisons for consents received from Wellington City Council

Figure 9.8 below shows the monthly trend for the building consents received by the DRU from Christchurch City Council. These numbers of consents are noticeably lower that that of

the other two centres referred to above. Although a smaller number of consents being sent to the DRU are expected for the Christchurch area, what percentage these numbers constitute of the non-residential building consent applications received by Christchurch City Council would give more context to these figures. Non-residential building consents are discussed in further detail in section 10 below.

It is somewhat more difficult to identify clear trends in the data represented in Figure 9.8 below due to the relatively lower numbers of consents. The numbers of consents received by the DRU from Christchurch City Council appears to peak in the third quarter of 2005 and 2006. However, an overall decline appears to occur during the last quarter of 2005 through the first half of 2006. A decline is also evident in the latter half of 2006 through to the end of the first quarter of 2007. July 2007 sees the highest monthly number received from Christchurch City Council by the DRU. Although this is the case, this number is low compared to Wellington and Auckland. The last quarter of 2007 sees some growth in numbers through to April 2008. An overall decline in numbers is seen for the remainder of the year.

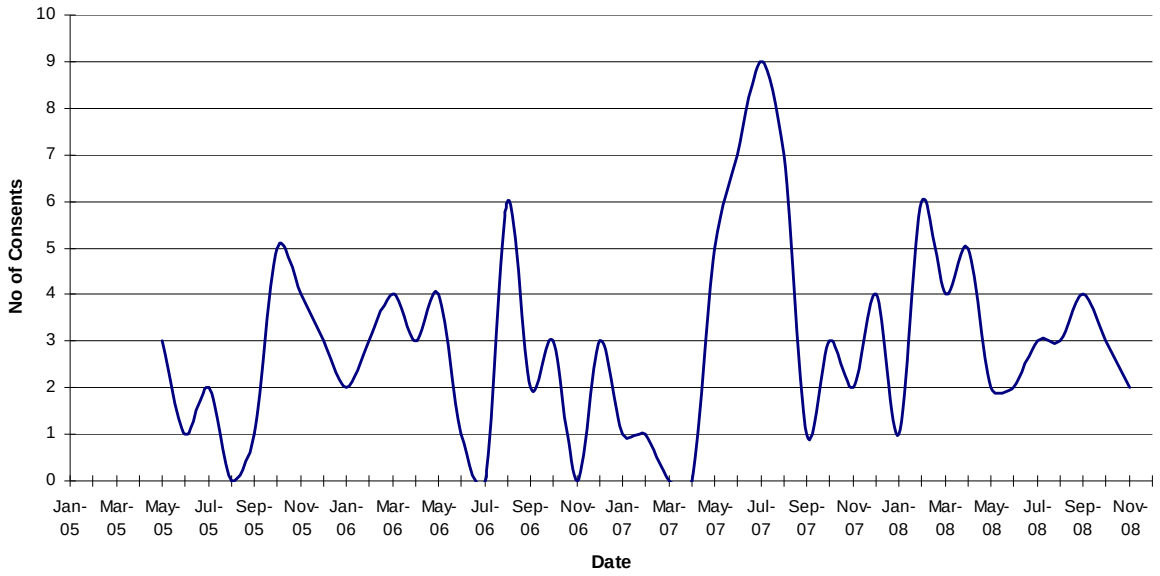


Figure 9.8: DRU consent numbers received from Christchurch City Council

Table 9.4 below identifies the monthly breakdown of the total number of consents received by the DRU from Christchurch City Council since April 2005. A graphical representation of this data can be seen in below it in Figure 9.9. The yearly consent totals for the Christchurch

area are seen to increase from when the DRU began in April 2005, through to 2007. The total for 2008 shows a decrease on the previous year. The average monthly consent numbers are much lower than the other centres and have risen slightly from 2005 and have remained constant since that time. At the time of writing, no data was available for April 2005 and December 2008.

Table 9.4: Monthly breakdown of the total number of consents received by the DRU from Christchurch City Council

2005 Consents		2006 Consents		2007 consents		2008 Consents	
Jan		Jan	2	Jan	1	Jan	1
Feb		Feb	3	Feb	1	Feb	6
March		March	4	March	0	March	4
April		April	3	April	0	April	5
May	3	May	4	May	5	May	2
June	1	June	1	June	7	June	2
July	2	July	0	July	9	July	3
August	0	August	6	August	7	August	3
September	1	September	2	September	1	September	4
October	5	October	3	October	3	October	3
November	4	November	0	November	2	November	2
December	3	December	3	December	4	December	
Total	**19**		**31**		**40**		**35**
Average/Month	**2**		**3**		**3**		**3**

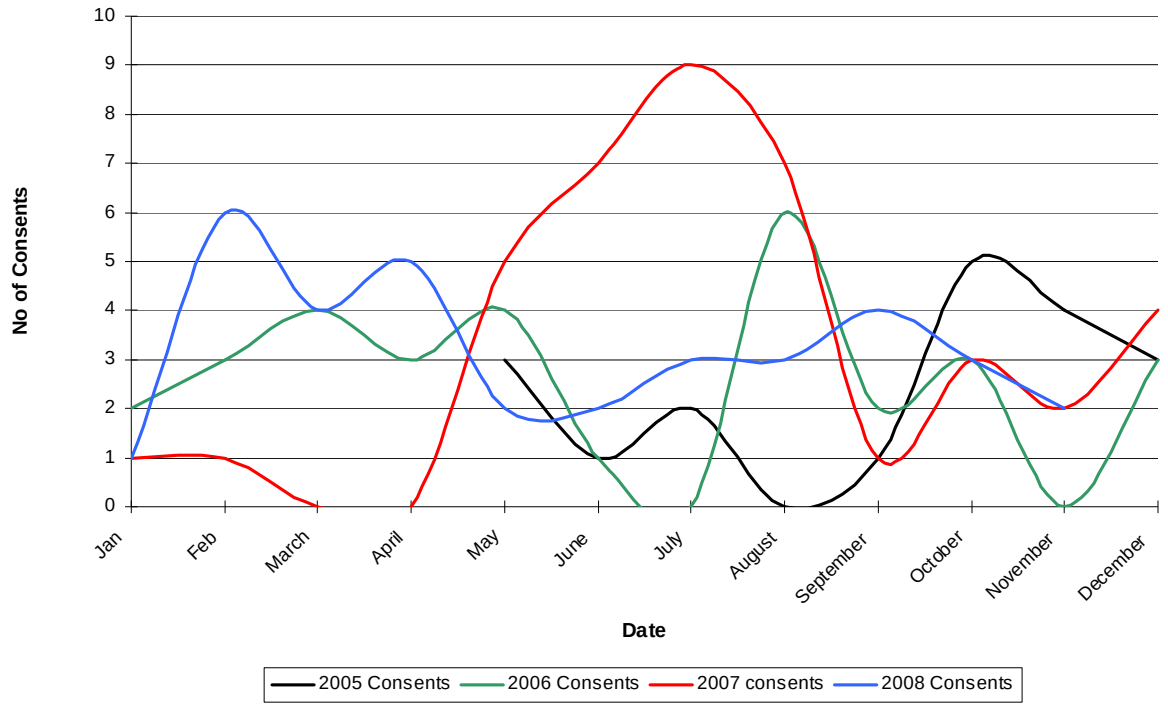


Figure 9.9:Yearly consent number comparisons for consents received from Christchurch City Council

Figure 9.10 below highlights a comparison of the yearly totals trend for Auckland, Wellington and Christchurch City Councils based on the data highlighted in the tables above. Of note is that all centres show an overall decline in the consent numbers they are sending to the DRU for review. This is the case even though the national monthly consent trend shows an increase in consent numbers since early in 2007. It must be noted, however, that although the monthly trend appears to show a decrease, it is not a measure of the total numbers of consents for that particular year.

Auckland's consent numbers are seen to increase since the DRU began but 2007 and 2008 have seen a consistent decline. This decline is also reflected in the monthly consent trend. For both Wellington and Christchurch, 2007 saw their highest yearly total to date. This is also seen as being the case with Wellington City Council with both the annual totals and the monthly consent numbers reflecting an overall decline.

Of note also is that the number of consents being sent to the DRU from Wellington City Council is greater than that sent by Auckland. This is not an expected result and it is not anticipated that Wellington would receive a greater number of building consent numbers that would trigger the requirements of Gazette Notice 56 than that of Auckland. In order to analyse this further, the non-residential building consent figures for Auckland, Wellington and Christchurch City Councils were reviewed. section 10 below outlines the results and findings.

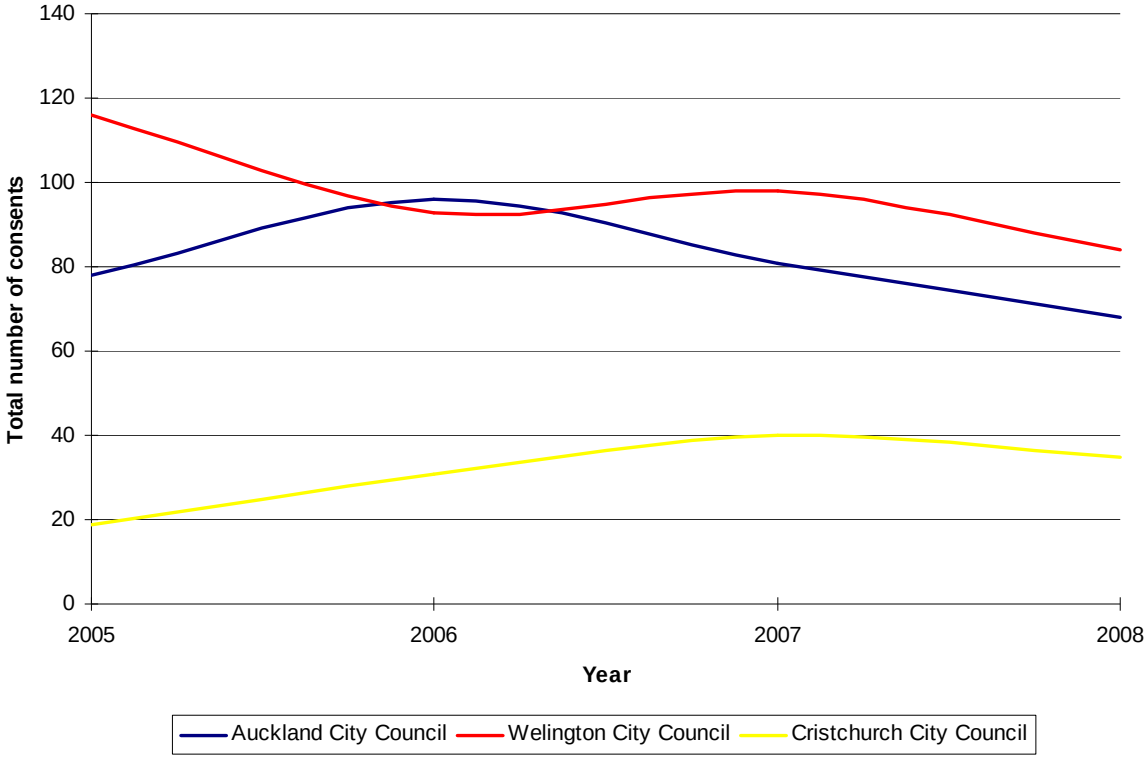


Figure 9.10 Comparison of the main centre yearly consent totals

10 NON-RESIDENTIAL BUILDING CONSENTS

In addition to the DRU consent numbers and breakdowns being reviewed, as part of this project the author also decided to review the no-residential building consent numbers being received by the BCA's in order to provide an overall industry trend. This was compared to the DRU consent numbers trends. In addition, the percentages of the non-residential building consents that the work of the DRU comprises of were also investigated. This work was carried out in order to further investigate any potential impacts on the levels of performance based design work being carried out in New Zealand since the changes to the Building Act in 2004.

Non-residential building consent figures were reviewed since April 2005 when the DRU began operating. These were also broken down for each territorial authority in New Zealand to give monthly totals. The overall national trend was reviewed against the consent numbers received by the DRU, as well as the three main centres of Auckland, Wellington and Christchurch. The percentages of the consents received by the DRU against national totals were then reviewed.

In order to investigate the above, non-residential building consent statistics were reviewed. Non-residential building consent figures are collected and maintained by Statistics New Zealand (SNZ). The data that SNZ collects for building consents is obtained on a monthly basis from all territorial authorities across New Zealand. Since September 1989, consents below $5,000 have been excluded for the purposes of collecting these statistics. All of these building consent values are inclusive of GST and are not inflation adjusted[15].

10.1 Classification of building types

For the purposes of collecting this data, SNZ classifies building type as *"A building is classified according to its main intended function. Some consents are for a building that may have more than one purpose (such as a shop/office building). Before June 1996, these consents were classified to a separate multi-purpose category. From the June 1996 month, the floor area and value of a consent for a multi-purpose building is split between each of the building's main functions. When sufficient detail cannot be obtained, the building is classified according to the predominant function of the building."*

10.2 Non-residential building consents - nationally

Figure 10.1 below highlights the total monthly national non-residential building consent numbers received by all territorial authorities across New Zealand since the inception of the DRU in April 2005.

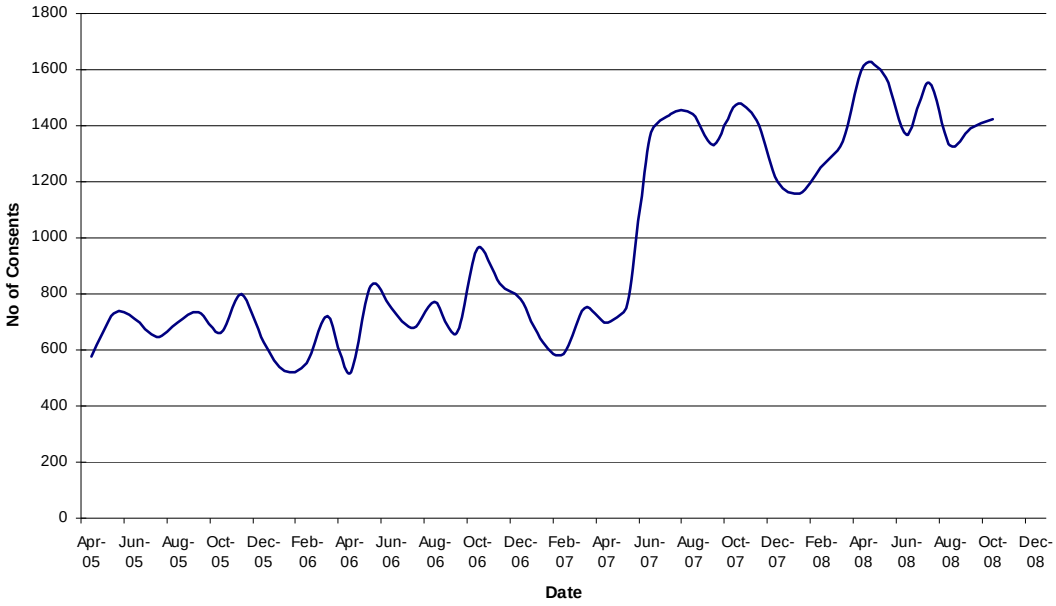


Figure 10.1: Monthly non-residential building consent trend – Nationally

It is evident that since April 2005, there has been an overall increase in the total number of monthly non-residential building consents being received by territorial authorities across New Zealand. This increase becomes more pronounced from the beginning of 2007, with the peak number to date being in April 2008. A slight downward trend is seen towards the end of 2008. It is not surprising that this trend exists and it is most certainly a reflection of the activity in the building and construction industry at that time. Although the monthly totals seen above show an over all increase, they do not necessarily represent the total annual trend. In order to confirm this trend, these totals were reviewed. Table 10.1 below highlights this data.

Table 10.1: Monthly breakdown of the total number of non-residential consents nationally

2005 Consents		2006 Consents		2007 consents		2008 Consents	
Jan		Jan	527	Jan	630	Jan	1158
Feb		Feb	554	Feb	588	Feb	1251
March		March	722	March	748	March	1346
April	575	April	517	April	696	April	1614
May	732	May	828	May	768	May	1572
June	710	June	750	June	1360	June	1368
July	647	July	681	July	1444	July	1552
August	696	August	771	August	1442	August	1330
September	735	September	659	September	1332	September	1390
October	659	October	962	October	1474	October	1422
November	798	November	835	November	1420	November	
December	630	December	781	December	1202	December	
Total	**6,182**		**8,587**		**13,104**		**14,003**
Average/Month	**687**		**716**		**1,092**		**1,400**

Table 10.1 above highlights that since 2005, the total annual number of non-residential building consents received by the BCA's across New Zealand has increased each consecutive year. This increase in the total yearly consent numbers is also reflected by a corresponding increase in the average monthly totals. In comparison, Figure 10.2 below highlights the total monthly numbers of consents received by the DRU on a national basis across the same timeframe.

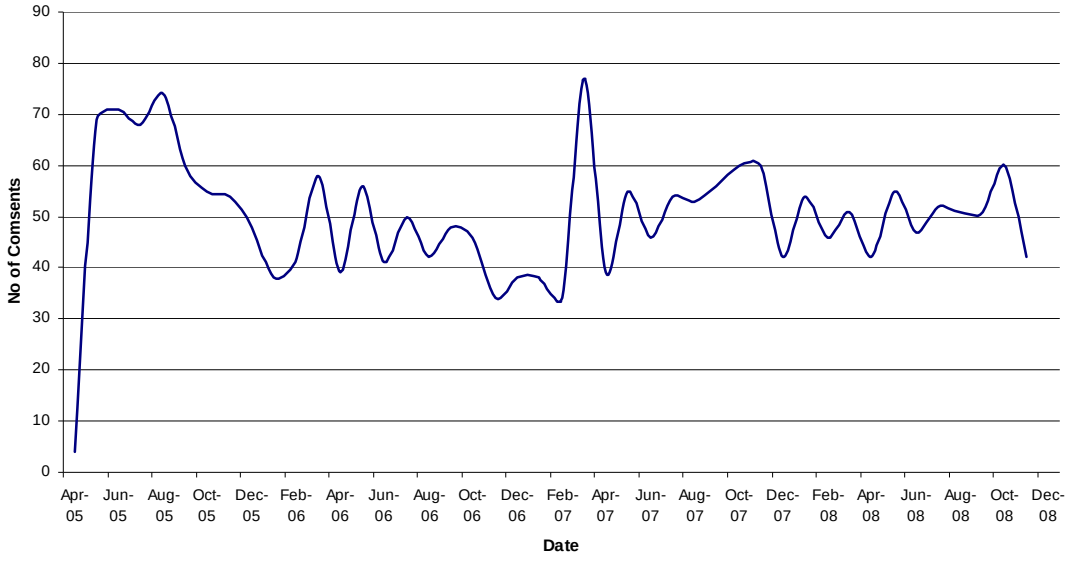


Figure 10.2: Monthly DRU building consent numbers trend - Nationally

The above results highlight a high national total of consents received immediately following the inception of the DRU. From here, an overall downward trend is seen throughout 2005 and 2006. March 2007 saw the consent numbers spike to 77, the highest monthly total recorded to date. The remainder of 2007 saw an overall increase in consent numbers, with 2008 not having any significant trend apart from a decrease in consent numbers in the closing months of 2008. It is seen that although a significant upward trend in the national non-residential building consent totals are seen since early in the first quarter of 2007 continuing into the first quarter of 2008, this same trend is not reflected in the numbers of building consents received by the DRU.

Figure 10.3 below highlights the total monthly consents received by the DRU as a percentage of the total non-residential building consent received by all territorial authorities since the DRU began operating.

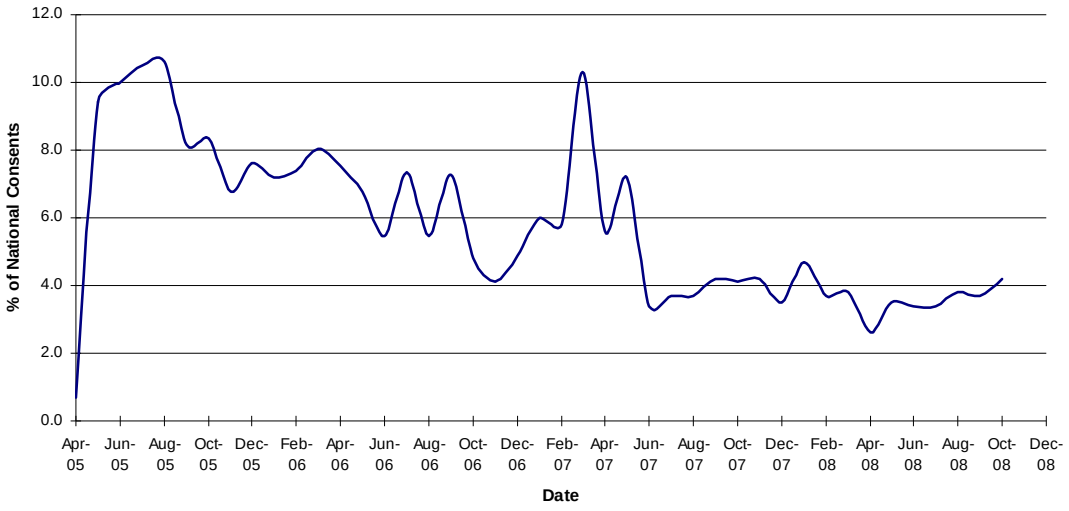


Figure 10.3: DRU consents as a percentage of the national non-residential building consent numbers

The results shown above clearly highlight that since the DRU began a consistent overall decline in the percentage of the national non-residential consents being seen by the DRU has occurred. Early 2007 saw a significant increase, but a decline followed into the second quarter of the year. The latter half of 2007 was reasonably consistent with a further decline evident in the first quarter of 2008. May 2008 saw a slow increase beginning to occur. Since the DRU began operating the average monthly percentage of national non-residential building consents being sent to the DRU is 6%.

10.3 Auckland, Wellington and Christchurch non-residential building consents

The figures obtained from SNZ were also looked at in the context of the three main centres of Auckland, Wellington and Christchurch. Figure 10.4 below highlights the monthly non-residential building consent numbers for Auckland City Council.

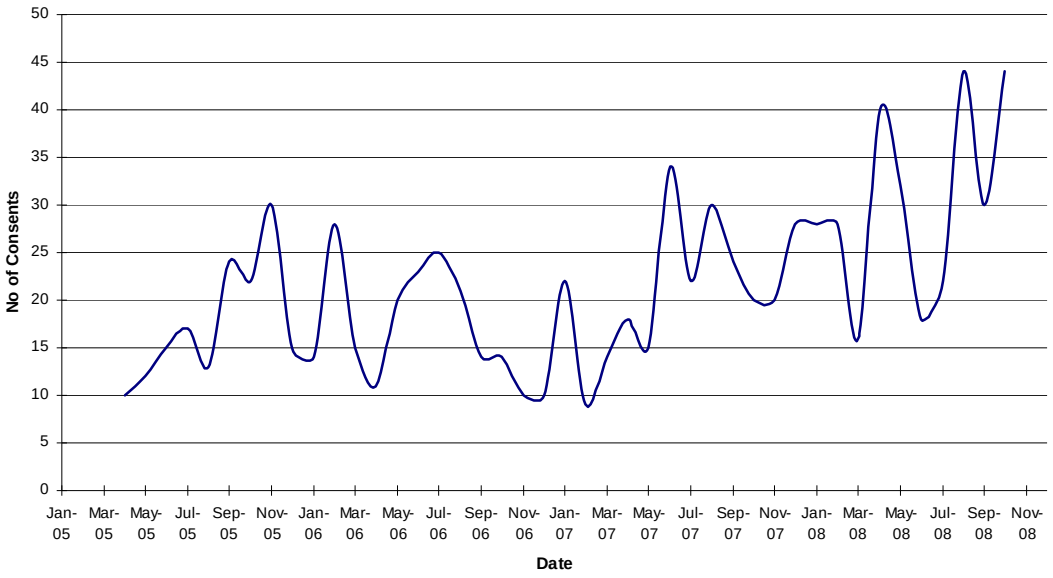


Figure 10.1: Monthly non-residential building consent numbers – Auckland City Council

Since April 2005 the trend for Auckland has followed a similar growth pattern as that of the national trend. Whilst we see a gradual downward trend in the last quarter of 2006, it is evident that 2007 and 2008 show an overall positive growth pattern. This is not surprising given the population density in the Auckland area and the fact that positive growth in the construction sector has occurred during this time. In comparison, the building consent numbers received by the DRU from Auckland City Council can be seen in Figure 9.4. These numbers are seen to have an overall decline trend since April 2005 and do not match the growth trend seen in the non-residential consent numbers in Figure 10.4 above since February 2007.

Table 10.2 below highlights the non-residential building consent annual totals for Auckland City Council. The data shows a consistent increase since 2005 and this reflects that seen for

the national data above. The monthly average dipped slightly in 2006, but since that time this figure has also steadily increased.

Table 10.2: Monthly breakdown of the total number of non-residential consents nationally

2005 Consents		2006 Consents		2007 consents		2008 Consents	
Jan		Jan	14	Jan	22	Jan	28
Feb		Feb	28	Feb	9	Feb	28
March		March	15	March	14	March	16
April	10	April	11	April	18	April	40
May	12	May	20	May	15	May	32
June	15	June	23	June	34	June	18
July	17	July	25	July	22	July	22
August	13	August	21	August	30	August	44
September	24	September	14	September	24	September	30
October	22	October	14	October	20	October	44
November	30	November	10	November	20	November	
December	15	December	10	December	28	December	
Total	**158**		**205**		**256**		**302**
Average/Month	**18**		**17**		**21**		**30**

The results of converting the monthly DRU consents to a percentage of the total non-residential building consents received by Auckland City Council since the DRU began, is highlighted below in Figure 10.5.

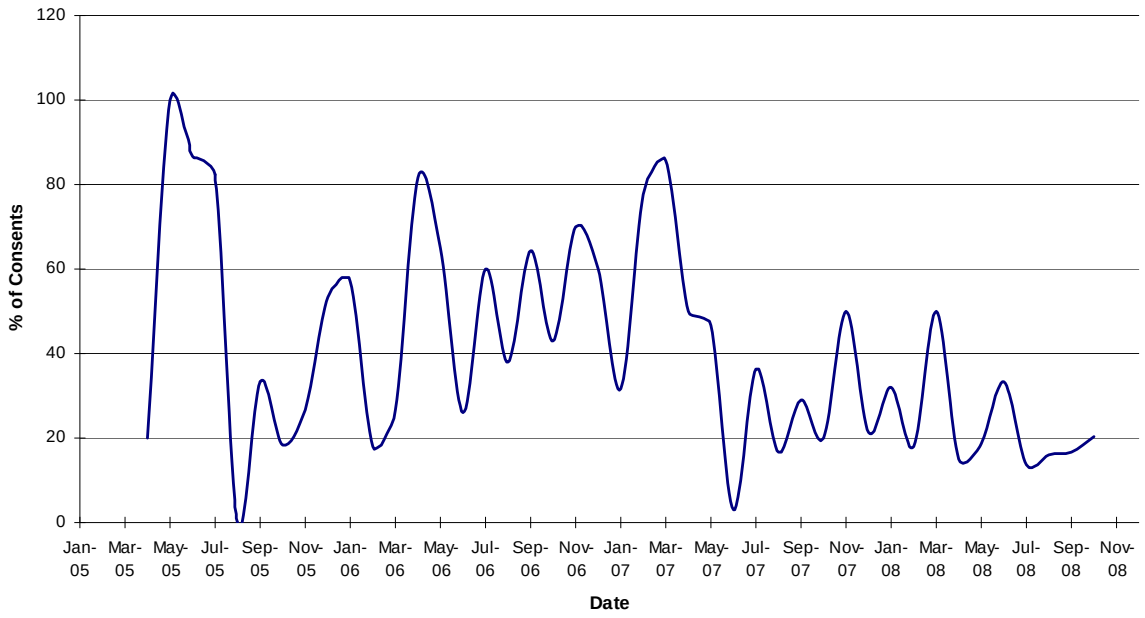


Figure 10.2: DRU consents as a percentage of the non-residential building consent numbers received from Auckland City Council

The results above highlight a gradual increase in the percentages of Auckland City Council's consent numbers being sent to the DRU from the last quarter of 2005 through to the end of 2006. The second quarter of 2007 saw a dramatic decrease with the latter half of 2007 seeing more even percentages. February 2008 sees a declining trend through to the end of 2008. From February 2007, the trend for Auckland City Council shares a similar trend to that of the overall national trend.

May 2005 saw Auckland City Council forward two more building consent applications to the DRU then were actually received according to SNZ and DRU statistics. It is not clear why this is the case and such a situation has not occurred since. It is possible that these building consents were for residential properties. Overall, since the DRU began operating, the average monthly percentage of national non-residential building consents being sent to the DRU by the Auckland City Council is 40%.

Figure 10.6 below highlights the monthly non-residential building consent numbers for Wellington City Council.

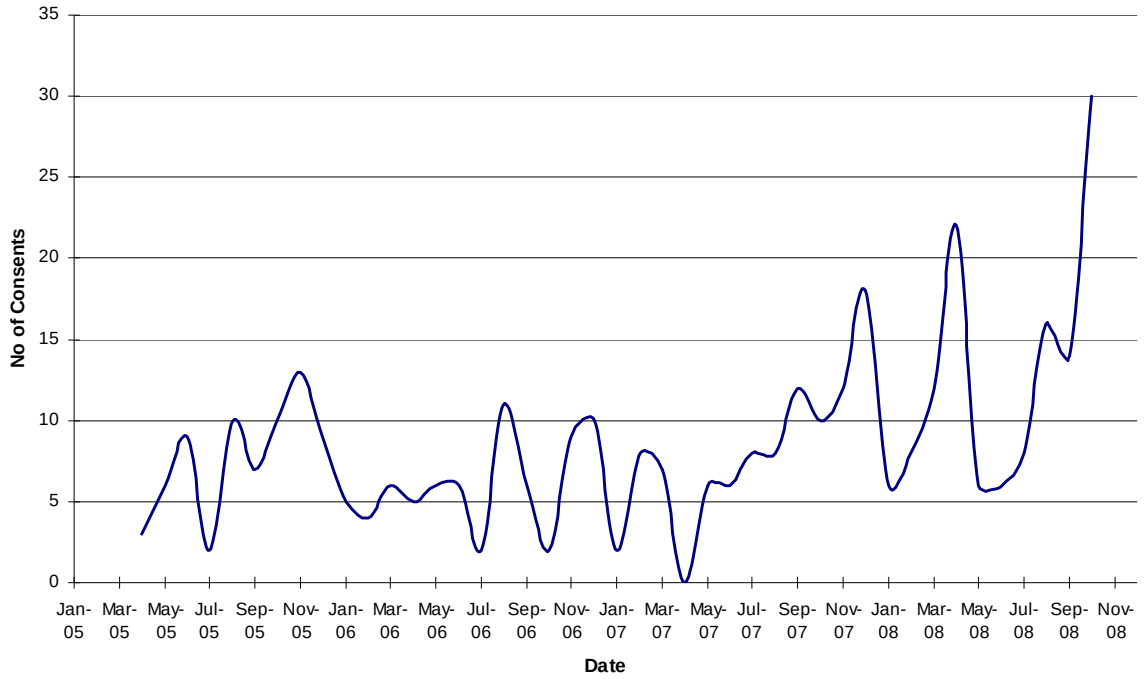


Figure 10.3: Monthly non-residential building consent numbers – Wellington City Council

The results above highlight a gradual increase in consent numbers in 2005 up until November. Thereafter, an overall declining trend is seen until April 2007. Although this is the case, the numbers of non-residential building consents received by Wellington City Council in this period are relatively low. From May 2007 until the end of the year a steady increase in consent numbers is evident. The first quarter of 2008 sees a varied growth period, however, an overall positive growth trend is evident for the remainder of the 2008 year. Although Wellington City Councils consent numbers are lower than that of Auckland, Wellington's monthly non-residential building consent numbers trend follows a very similar growth trend to that of Auckland.

In comparison, the building consent numbers received by the DRU from Wellington City Council can be seen in Figure 9.6. These numbers are seen to have an overall decline trend since April 2005 and through to the end of 2006. Although we see a spike in numbers at the end of the first quarter of 2007, the remainder of the year and through 2008 saw DRU numbers remain reasonably stable. So although we see an increase in the numbers of non-residential building consents from May 2007 as shown in Figure 10.6 above, this is not reflected in the consent numbers received by the DRU.

Table 10.3 below highlights the non-residential building consent annual totals for Wellington City Council. The data shows that Wellington also reflects the trend as seen nationally as well as that of Auckland, with a consistent growth in non-residential consent numbers since 2005. The monthly average trend for Auckland is also seen below for Wellington.

Table 10.3: Monthly non-residential building consent totals for Wellington City Council

2005 Consents		**2006 Consents**		**2007 consents**		**2008 Consents**	
Jan		Jan	5	Jan	2	Jan	6
Feb		Feb	4	Feb	8	Feb	8
March		March	6	March	7	March	12
April	3	April	5	April	0	April	22
May	6	May	6	May	6	May	6
June	9	June	6	June	6	June	6
July	2	July	2	July	8	July	8
August	10	August	11	August	8	August	16
September	7	September	6	September	12	September	14
October	10	October	2	October	10	October	30
November	13	November	9	November	12	November	
December	9	December	10	December	18	December	
Total	**69**		**72**		**97**		**128**
Average/Month	**8**		**6**		**8**		**13**

The results of converting the monthly DRU consents to a percentage of the total non-residential building consents received by Wellington City Council since the DRU began, is highlighted below in Figure 10.7.

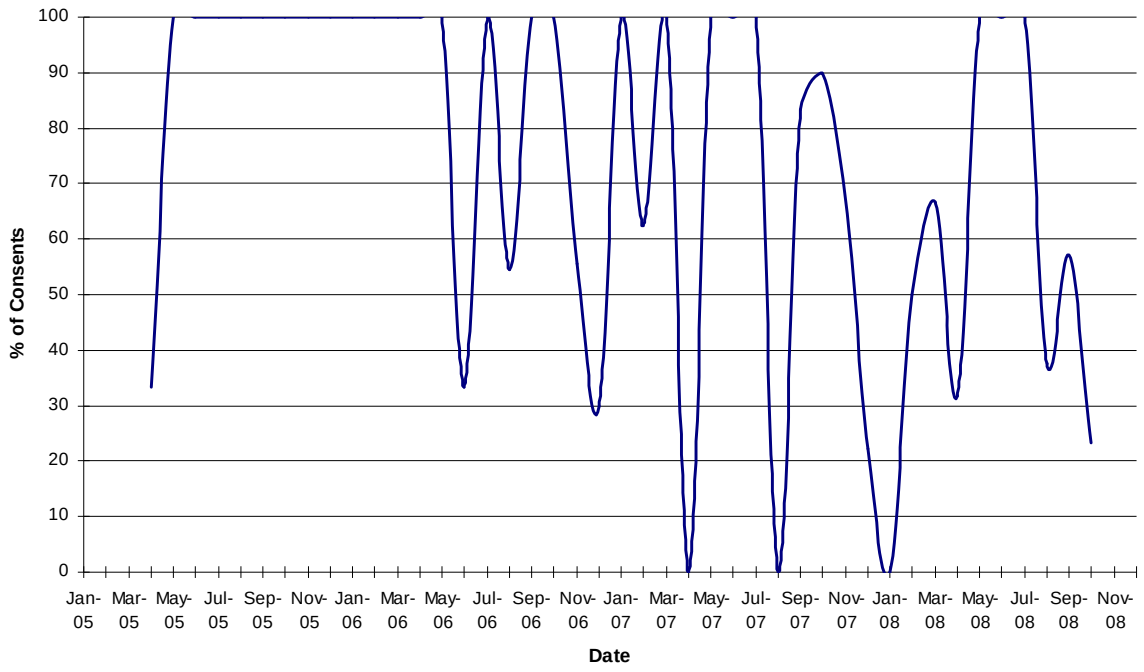


Figure 10.4: DRU consents as a percentage of the non-residential building consent numbers received from Wellington City Council

The results above highlight an overall gradual decline in the percentage of Wellington City Council's building consents that are sent to the DRU. In saying that, the number of consents sent to the DRU on a monthly basis is not that high and as such the decline is overall slight. Although arguably a similar, yet less pronounced overall trend to that of Auckland, the results also identify an interesting reoccurrence. Figure 210.7 above shows that in a high number of cases, all of the monthly non-residential building consents received by Wellington City Council were forwarded to the DRU. This has been identified when a comparison was made of the monthly non-residential building consent data held by SNZ and the numbers of consents forwarded by Wellington City Council.

Closer inspection of the data shows that for each occasion the data point represents 100% of the consents in Figure 28 above, Wellington City Council has forwarded a greater number of consent applications to the DRU than what it received itself, based on the data from SNZ and the numbers of consents received by the DRU. Between April 2005 and November 2008, this has been seen to occur in 24 of the 43 months (56%) for which the data was analysed. This has not been the case in either Auckland or Christchurch and it is somewhat unclear as to why this has occurred and occurred with relative consistency since April 2005. The results shown in Figure 10.7 above highlight how this occurrence is more prominent in 2005 and

gradually decreases over time. One possible reason for this is that the Council may have misinterpreted in the early stages, the criteria outlined in New Zealand Gazette Notice 56 specifying the requirements for when a building consent must be forwarded to the DRU. It would be surprising if this was in fact the case as the process has matured with time, due to repetitive guidance given by both the Department of Building and Housing and the NZFS. An example of this is the road shows carried out by both organisations in 2006 to meet with Councils, design professionals, Architects and project managers.

To account for this occurrence also, it is possible that consents not falling within the non-residential building category were also sent to the DRU. Although the Building Act does not prevent consents being sent to the DRU at the Council's discretion, it would be surprising if consents that fell outside of the requirements of the Building Act were also being sent to the DRU. It was not possible with the data available, however, to establish a valid reason for these occurrences.

In addition, should the Council have interpreted the Gazette notice correctly, then this would suggest that all of the non-residential building consents received by Wellington City Council during these periods would have been performance based designs. Overall, since the DRU began operating, the average monthly percentage of national non-residential building consents being sent to the DRU by the Wellington City Council is 74%.

Figure 10.8 below highlights the monthly non-residential building consent numbers for Christchurch City Council.

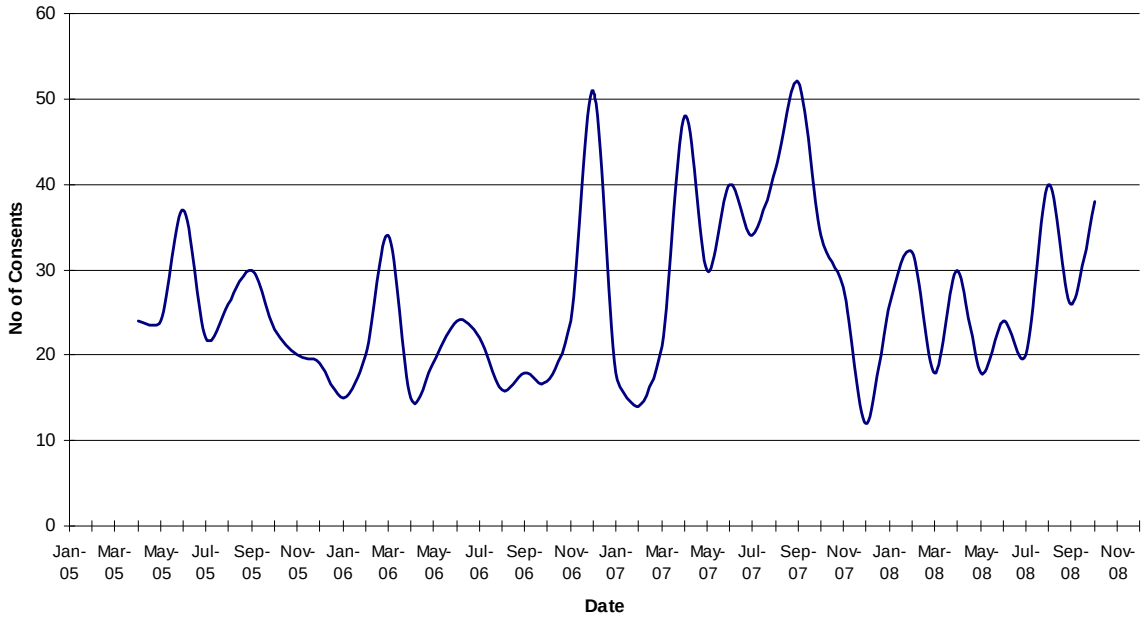


Figure 10.8: Monthly non-residential building consent numbers – Christchurch City Council

The trend for Christchurch since April 2005 presents a slightly different and less pronounced result than Auckland and Wellington. Interestingly, Christchurch's monthly non-residential building consent numbers are greater than that of Wellington and at times are on a par with that of Auckland. Figure 10.8 above highlights an overall decline in the consent numbers through to the end of 2005. 2006 sees a slight increase with certain months showing a higher peak in numbers compared with the rest of the year. 2007 shows a greater number of consents and a positive upward trend from February until September until it dropped to its lowest level in December. 2008 has seen a consistent upward growth trend.

In comparison, the building consent numbers received by the DRU from Christchurch City Council can be seen in Figure 9.8. These numbers are seen to be lower than those sent to the DRU by Auckland and Wellington City Councils, yet the non-residential building consent numbers received by Christchurch City Council are greater than that of Wellington and on a par with that of Auckland. On the assumption that Christchurch City Council are forwarding the consents that fall within the requirements of Gazette Notice 56 to the DRU, then it is certainly a possible conclusion that a far less percentage of performance based design work is being carried out in the Christchurch area, with prescriptive design work accounting for the majority of this work.

Table 10.4 below highlights the non-residential building consent annual totals for Christchurch City Council. The data shows a consistent increase in consent numbers from 2005 but then shows a downward trend for 2008. Although at the time of writing, no data was available for November and December, it is unlikely that 2008 total would have shown an increase on the year previous. In saying that, strong growth in consent numbers is seen since 2005. The monthly total varies more so than that of Auckland and Wellington, with increases in monthly totals being followed the next year by a decline.

Table 10.4: Monthly non-residential building consent annual totals for Christchurch City Council

2005 Consents		**2006 Consents**		**2007 consents**		**2008 Consents**	
Jan		Jan	15	Jan	18	Jan	26
Feb		Feb	20	Feb	14	Feb	32
March		March	34	March	21	March	18
April	24	April	15	April	48	April	30
May	24	May	19	May	30	May	18
June	37	June	24	June	40	June	24
July	22	July	22	July	34	July	20
August	26	August	16	August	42	August	40
September	30	September	18	September	52	September	26
October	23	October	17	October	34	October	38
November	20	November	24	November	28	November	
December	19	December	51	December	12	December	
Total	**225**		**275**		**373**		**272**
Average/Month	**25**		**23**		**31**		**27**

The results of converting the monthly DRU consents to a percentage of the total non-residential building consents received by Christchurch City Council since the DRU began, is highlighted below in Figure 10.9.

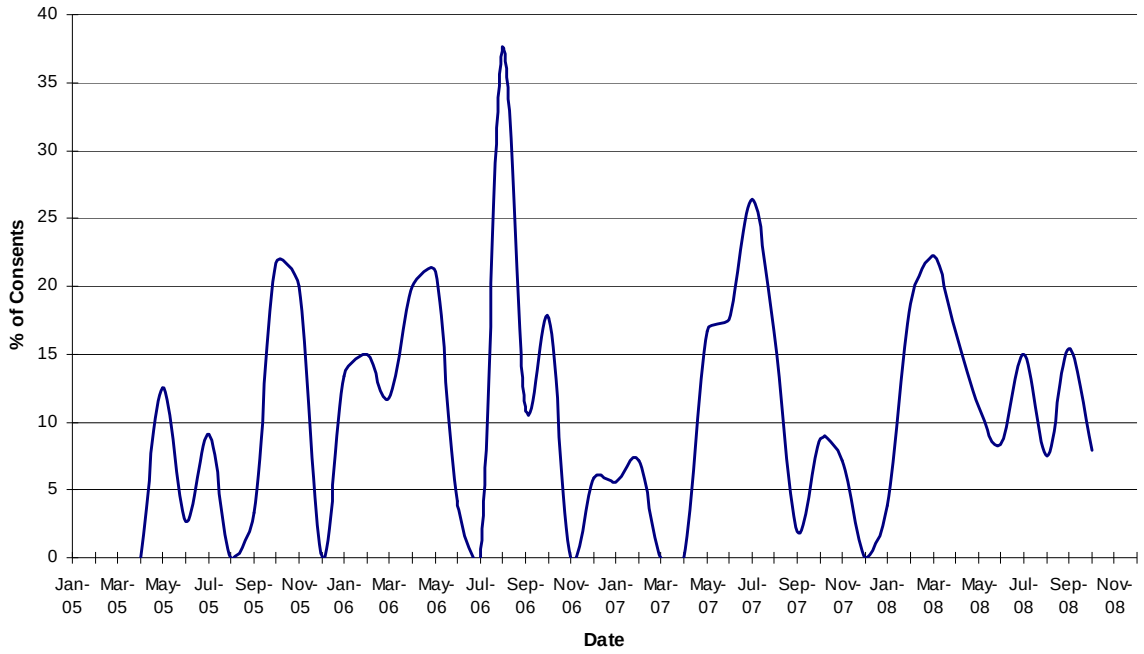


Figure 10.5: DRU consents as a percentage of the non-residential building consent numbers received from Christchurch City Council

It is immediately apparent that the percentages shown in Figure 10.9 above are quite a bit lower than that of Auckland and Wellington City Councils with the data shown above following less of an apparent trend. There appears to be a general trend downwards in the second quarter of 2005 with higher percentages seen the last quarter of 2005 and then first quarter of 2006. August 2006 saw the highest percentage yet recorded but numbers dropped off considerably for the remainder of the year and for the first quarter of 2007. The second quarter of 2007 saw a growth in numbers but again, these dropped off in the last quarter. 2008 saw some growth at the beginning of the year, but has again slowed as the year has progressed.

Although the non-residential building consent numbers for Christchurch highlight a trend since April 2005, the percentage of these forwarded to the DRU by Christchurch City Council presents a very varied result. Increases in the non-residential consent numbers from May 2007 have also seen a corresponding increase in the percentages of consents forwarded to the DRU. Early 2008 saw a similar pattern. However, the percentages of consents sent to the DRU by Christchurch City Council have varied constantly from month to month and have not followed in line with growths seen in their non-residential building consent figures.

Overall, since the DRU began operating, the average monthly percentage of national non-residential building consents being sent to the DRU by the Christchurch City Council is 11%, the lowest of the three main centres.

Figure 10.10 below highlights a comparison of the total yearly non-residential building consents received by Auckland, Wellington and Christchurch City Councils based on the data highlighted in the tables above. The results show that all three Councils show an increase in the number of consents received since 2005, with the exception of a decrease in numbers in Christchurch since 2007. Of note, is that Christchurch City Council have received the greatest number of non-residential building consent applications from 2005 to 2007, with Auckland only receiving slightly more in 2008. In addition, Wellington City Council has received quite a number less than that of the other two centres.

This is certainly surprising given that numbers of consents being forwarded to the DRU by Christchurch City Council are quite a bit lower than that of the other two centres. It is interesting also as it was considered by the author to be a smaller centre in terms of non-residential building activity. In saying that, however, the results presented below raise questions as to why the DRU consents are so low from Christchurch compared with the other centres and in addition, why does Wellington City Council have the lowest number of non-residential building consent numbers, but the highest percentage of consents being forwarded to the DRU. In addition, the number of consents sent to the DRU for review is greater than the number of non-residential building consents it actually receives.

One possible reason for these discrepancies is that the consents do not trigger each of the requirements of the Gazette Notice, i.e. the consent applications are not all for buildings that require an evacuation scheme and are alternative solutions to the Building Code. In addition, another possibility is that the Gazette Notice itself is unclear to the Council and as seen in the DRU audit feedback and in the non-residential building consent figures, the Council may not be sending all of the ones that they should be to the DRU for review, or in the case of Wellington, are sending more than they receive. It would follow therefore that the Gazette Notice may be proving unclear when being interpreted by them.

One other possibility for the discrepancies highlighted above is that the levels of performance based design are varying considerably between the main centres. Of note from the

questionnaire results described in section 11 below, is that fire engineering consultants themselves have confirmed that since the 2004 Building Act came into force, they have chosen to get involved in less performance based design work and that it is accounting for a lower percentage of their work than it did prior to the changes being implemented. The numbers of non-residential building consents has over this time, however, has not decreased as appears to be the case for the consent numbers being sent to the DRU for review.

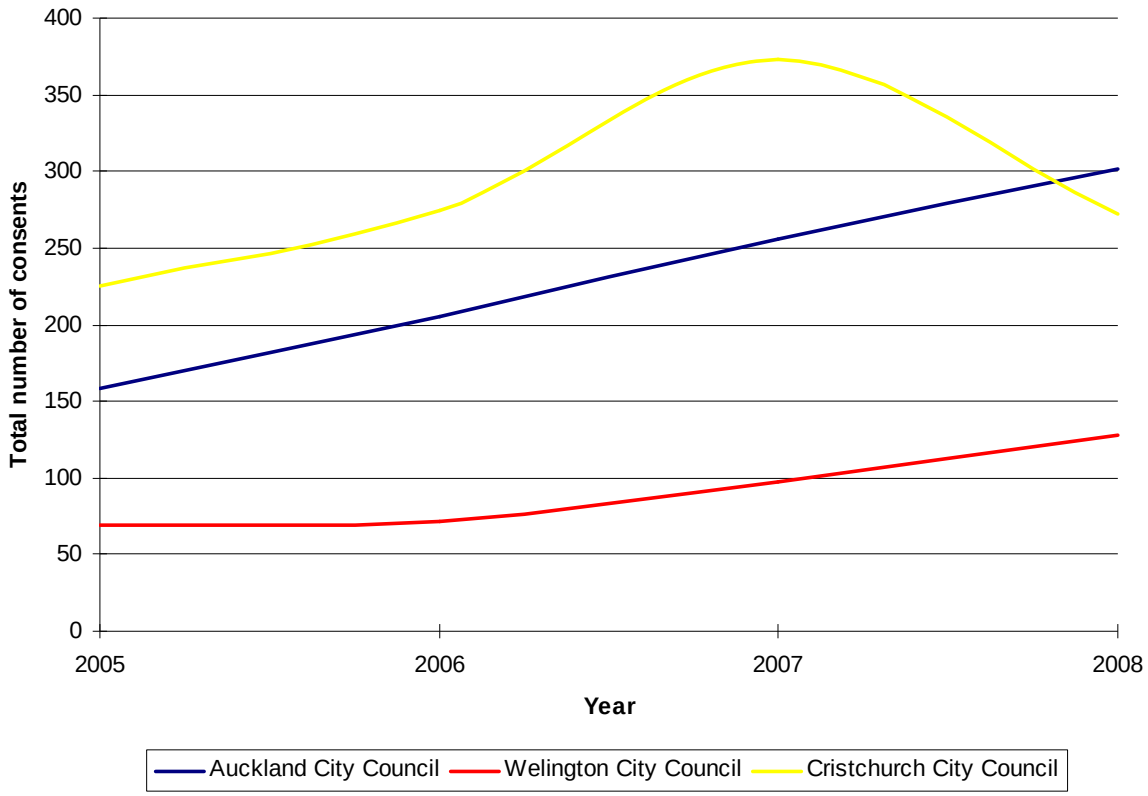


Figure 10.6: Comparison of the total yearly non-residential building consents received by Auckland, Wellington and Christchurch City Councils

11 FIRE INDUSTRY QUESTIONNAIRE

Noting the content of the audit reports referred to earlier, it was decided that as part of this project, a questionnaire would be sent to members within the fire industry. Specifically, this questionnaire was sent to the SFPE members of the New Zealand chapter. This was decided upon as the list extended over a wide range of individuals and companies from consulting fire engineers to building consent authorities. The questionnaire asked 14 questions in total and was intended to get an overview of their views about the involvement of the NZFS in the building consent process and more specifically in part, the involvement of the DRU. The questionnaire and accompanying cover letter sent to the fire industry can be seen in Appendix 5.

Of most interest from the questionnaire was whether there appears to be an impact on performance-based design since the changes to the Building Act 2004 and the inception of the DRU. Individuals were asked to indicate the percentage of performance versus prescriptive design that they have undertaken pre and post Building Act 2004. The questionnaire therefore asked individuals to indicate the levels of performance versus prescriptive design that has constituted their workload both pre and post Building Act 2004.

One of the interests of the author in association with the questions relating to performance based design work, was also to what extent respondents were involved in post consent site inspection and monitoring activities. Individuals were therefore asked to indicate the levels that they undertake.

The questionnaire also included questions relating to the memoranda issued by the DRU as per Section 47 of the Building Act 2004. These related to whether the memoranda received were clear, useful and informative. Overall, therefore the questionnaire sought to gain some context around the current workings of the fire industry in relation to design and inspection work and the impact, if any, of the 2004 changes to the Building Act on their work.

The author also contacted several of the respondents in order to clarify the content of their responses. All were forthcoming and very helpful in discussing their views. In addition, the

questionnaire was also forwarded to the NZFS Fire Engineering Manager for his consideration and feedback prior to being sent to the fire industry for completion.

11.1 Fire industry questionnaire feedback and results

The following feedback was received by respondents to the questionnaire.

Question 1 - Are you a Fire Consultant, an approval authority, other (please specify)

This opening question sought to determine what sector of the fire industry the respondent represented. This was requested in order to put the responses into context by industry group and determine whether views that were expressed within the questionnaire were consistent or otherwise across a range of groups within the fire industry. Figure 32 below highlights the breakdown of responses received. 94% of respondents represented the consultant fire engineering sector, whilst 6% represented those of a structural engineering background but not formally qualified in fire. It was surprising that although approval authorities are represented within the SFPE group, no responses were received from this sector of the fire industry, especially given the fact that the memoranda issued by the DRU are specifically intended to assist Councils in the building consent process.

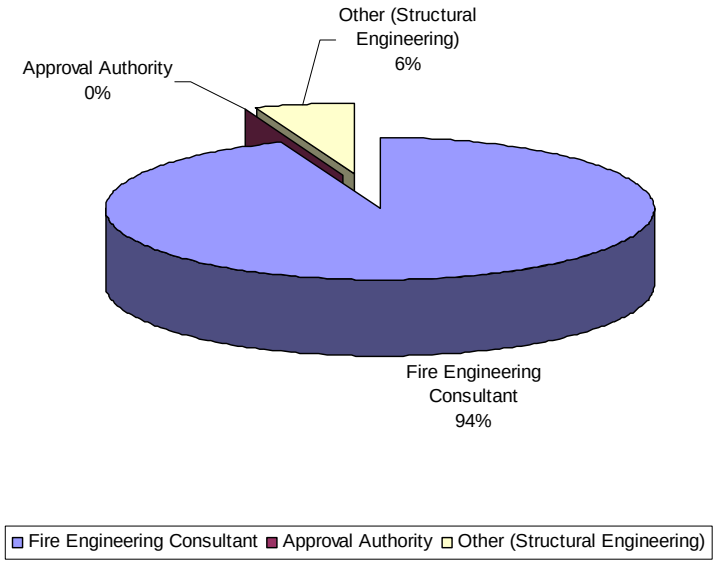


Figure 11.1: Area of fire industry represented

Question 2 - What region are you based in?

Respondents to the questionnaire represented eight regions within New Zealand. This spread is highlighted in Figure 33 below.

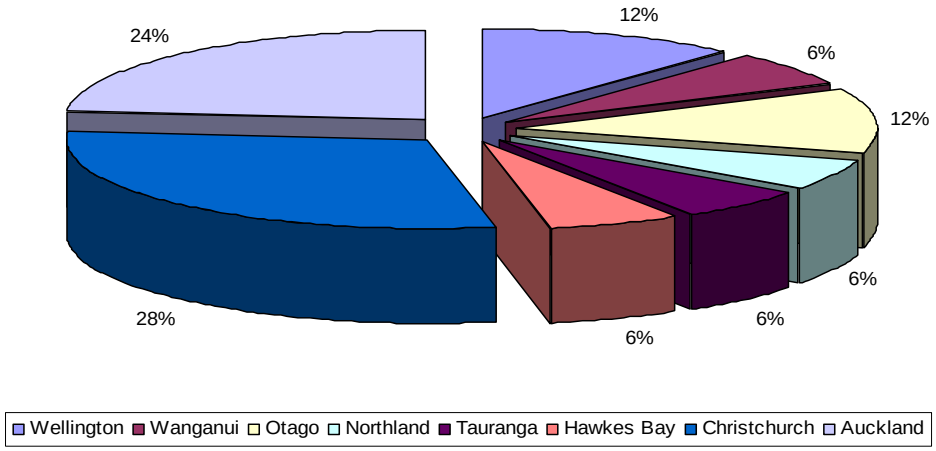


Figure 11.2: Areas within New Zealand represented by the respondents

Christchurch represented the greatest response percentage of respondents with 28%. This was followed by Auckland at 24% and Otago and Wellington at 12% each. The remainder of the areas were equally split at 6%. Although Auckland represented 24% of respondents, it is surprising that this figure was not substantially larger, given the higher concentration of fire engineering consultants in this location. One possible explanation for this figure is that some of the responses to the questionnaire received represented the views of the firm as a whole and not just the view of an individual. Although it is known that this was the case in some responses, individuals were encouraged to submit their own responses in order to achieve a greater response number and therefore a more widespread and representative feedback sample from within the industry. Several responses were received from individuals in addition to that already received from their particular firm or consultancy.

Question 3 - What design methodology does your organisation/firm use? (International Fire Engineering Guidelines (IFEG), SFPE Guide to Performance-Based Fire Protection, Construction Industry Council Guidelines (CIC), Other(s), please specify)

This question sought to identify the design methodologies and guideline used by respondents in performing their work. Figure 34 below highlights the breakdown of responses received.

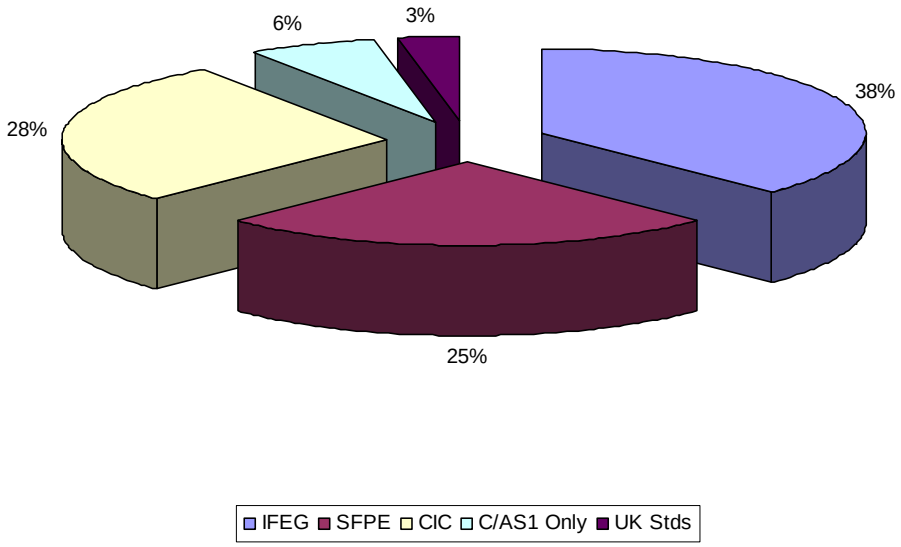


Figure 11.3: Design methodologies and guidelines used

The figures highlighted above account for where respondents mentioned several of the above items in a single questionnaire response. As such, the breakdown above has accounted for each item selected once and the totals were then calculated. From this total, the percentage of each option was calculated Although some respondents indicated that the use a combination of design guidelines, the IFEG were identified as that mostly used, followed by the CIC guidelines. The SFPE performance based design guide was the third most used guidance document. 6% of respondents indicated that C/AS1 is the only guidance document that they use, with 3% indicating that they also use UK standards. However, these were not specifically identified in the responses provided.

Question 4 - In your view, what percentage of performance versus prescriptive design has your organisation/firm been involved in?

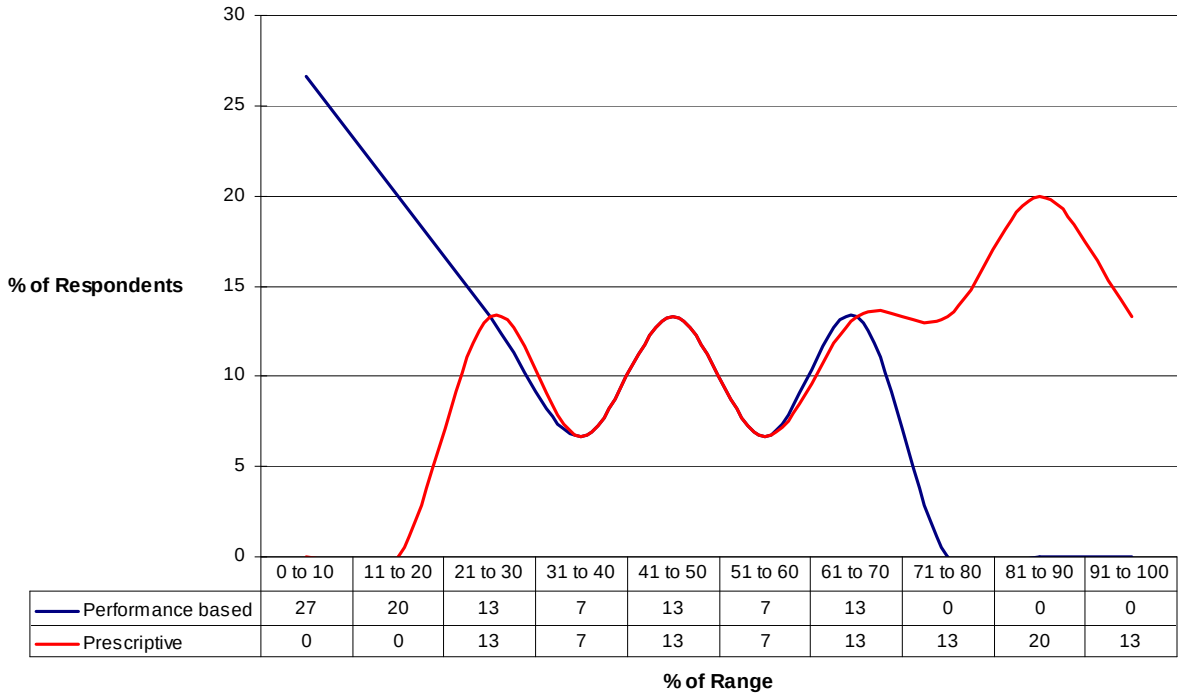
- ***Pre-Building Act 2004***

Performance–based _____% Prescriptive _____%

- ***Post Building Act 2004***

Performance–based _____% Prescriptive _____%
If there has been a change, could you please indicate why?

This question asked respondents to indicate the level of performance versus prescriptive design work they undertook both prior to and after the changes to the Building Act were implemented in 2004. This question sought to investigate whether or not respondents were indicating that the changes implemented in 2004 affected the levels of performance and prescriptive design work they were involved in. Respondents were asked to provide and indication of why, in their view, any changes occurred so as context to the figures provided could be established. Figure 35 below highlights the breakdown of performance versus prescriptive design work carried out before the 2004 Building Act was introduced as a percentage of their workload. It outlines a percentage range that this work falls within along the x-axis and also provides the percentage value of the respondent's workload for that particular range.



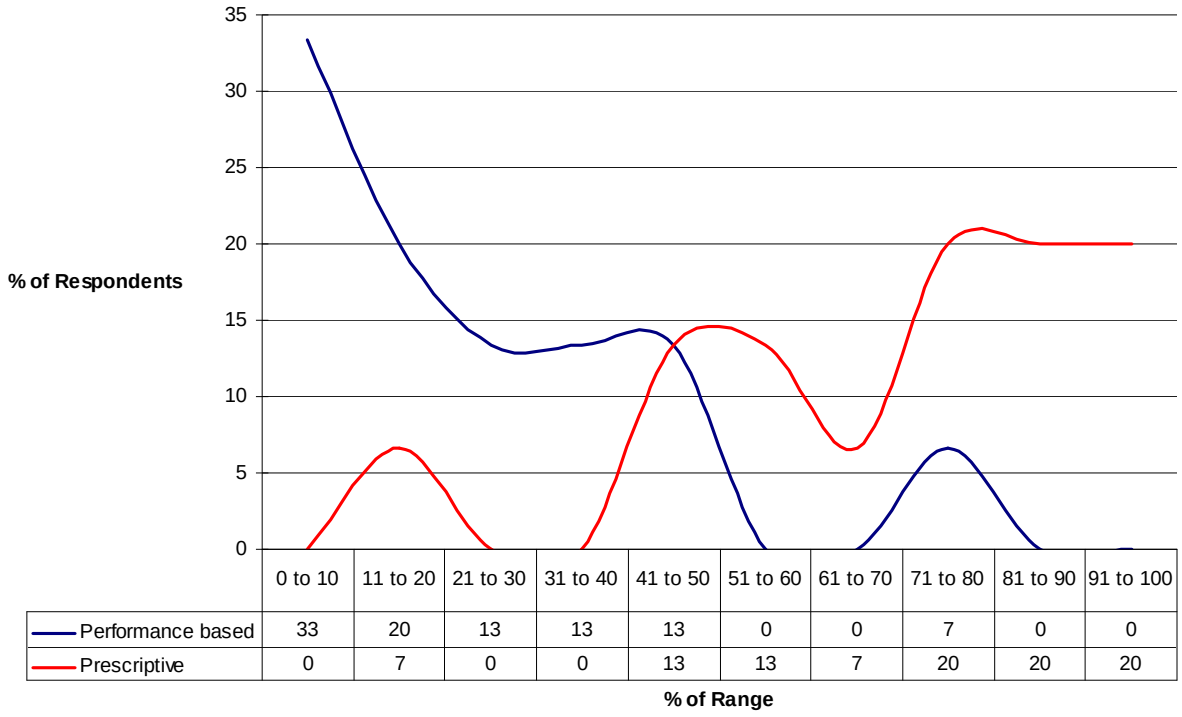
	0 to 10	11 to 20	21 to 30	31 to 40	41 to 50	51 to 60	61 to 70	71 to 80	81 to 90	91 to 100
Performance based	27	20	13	7	13	7	13	0	0	0
Prescriptive	0	0	13	7	13	7	13	13	20	13

Figure 11.4: Performance versus Prescriptive design work prior to the implementation of the 2004 Building Act

The results obtained above indicate that prior to the changes to the Building Act in 2004, 27% and 20 % of respondents indicated that performance based design work accounted for between 0% - 10% and 11% - 20% of their workload respectively. For these ranges, no

prescriptive design work was indicated as forming part of their workload. From the 21% to 70% range, both performance based and prescriptive design work formed the same percentages of their workload and represents quite a brad spread across these ranges. In the higher percentage ranges – 71% - 100%, performance based design work is not accounted for at all, with all of the workload in these ranges forming prescriptive design work.

Figure 36 below highlights the results provided by respondents following the changes to the Building Act in 2004.



	0 to 10	11 to 20	21 to 30	31 to 40	41 to 50	51 to 60	61 to 70	71 to 80	81 to 90	91 to 100
Performance based	33	20	13	13	13	0	0	7	0	0
Prescriptive	0	7	0	0	13	13	7	20	20	20

Figure 11.5: Performance versus Prescriptive design work after the 2004 Building Act

Performance and prescriptive design work breakdowns in figure 36 above present a different position than that represented prior to the 2004 changes. Results show that for performance based design work post 2004, the 0% - 10% range now accounts for a higher representation than before 2004. In addition, the range between 21% - 70% highlights a lower representation in performance based design than what was shown prior to 2004. The 50% and above ranges have shown a decrease in workload compared to before the 2004 changes.

Similar changes are seen for prescriptive design work percentages. Prior to 2004, prescriptive design work was represented consistently in the 21% and above ranges. Since 2004, this representation has shifted to being more profound in the higher percentages, with a less even spread in the lower ranges. The results show that certainly prior to 2004 there was much more of a mixture of performance based and prescriptive work in the middle ranges. Post 2004, this is not the case and increases are seen at the low and high end ranges. This would indicate that since 2004, there is a much more defined separation between performance based and prescriptive design work when respondents accounted for it as a percentage of their workload. A greater percentage of respondents indicated that performance based design work now accounts for a lower percentage of their work, displayed in the results by an increase in the lower ranges and less representation in the middle ranges. Consequently, this is off set by a decrease in the middle ranges for prescriptive work and an increase in representation in the higher ranges.

It must be noted here also, that post 2004, the 71% - 80% range increased and was the only one to do so in the higher ranges. Feedback from the respondents indicated that post 2004 saw a permanent fire engineering staff member be employed with their workload accounting for this percentage. In addition, a further comment reflected that different types of buildings for which the acceptable solutions are not the best answer for then follow a performance based design approach.

Respondents were also asked to indicate some reasons why a change had occurred should their workload breakdown have differed before and after 2004. Responses included:

- *Approval for performance based design become too difficult and benefits do not justify it*
- *Have to persuade the Territorial Authority but now also have to persuade a faceless person in an office in Auckland with little real world experience*
- *Councils are less willing to use common sense in applying the "as near as is reasonably practicable" clause*
- *Clients are preferring to do something that will be automatically accepted*

- *Easier to gain consent if it is not performance-based as then the DRU red tape is not involved*

- *Clients require certainty with respect to their projects. There are risks associated with DRU comments after building consent has been lodged and is unacceptable to their clients i.e. delays in receiving building consent, costs in reworking drawings and effects on other services - mech, elect, quantity surveying, and lastly the need for the design team to work to a budget. Certainty drives the project towards a C/AS1 approach therefore.*

- *Negative feedback from DRU forces practitioners to look to prescriptive solutions*

- *Too much conservatism and effort in approval for some specific designs*

Responses indicate displeasure with the process since the changes to the Building Act in 2004 have come into force. They appear to feel that since these changes, the process of gaining building consent has become more onerous and complicated. Certainty in the design process was also highlighted as the main reason as to whether a client would opt for a purely prescriptive approach, rather that a performance based one. The inclusion of the NZFS in the building consent process appears to be viewed by respondents as the sole reason for why they are now viewing the path to gaining building consent more restrictive. Although this is one view, it must also be noted that prior to the 2004 Building Act changes, design work appeared to largely go unchallenged and the relationship was mainly with the designer and local Councils. The adoption of the IFEG in New Zealand aimed to set a robust process for fire engineering design that involved relevant stakeholders and brought issues out early in the building design process. In addition, the NZFS maintains a staff of regionally based fire engineers that are available during the pre building consent stages.

Several large developments have taken place in New Zealand to assist the design and building consent processes in recent years, and it is surprising that feedback from the design community does not appear to see such changes as positive or beneficial to the industry from the responses received.

Question 5 - What work does your client brief you to undertake? Please tick as many as you feel are relevant. (To achieve approval of building consent, to provide input to other designers, to demonstrate compliance with the Building Act, Other (please specify))

This question sought to gain some information regarding any specific requirements of the client in engaging fire industry professionals in the consent process on their behalf. In doing so it was intended to investigate what services are commonly requested by the client. Three initial options were presented – approval of a building consent, input into other designers and compliance with the Building Act. Respondents were also asked to include further categories should they feel appropriate. Figure 37 below highlights the breakdown of responses provided to this question.

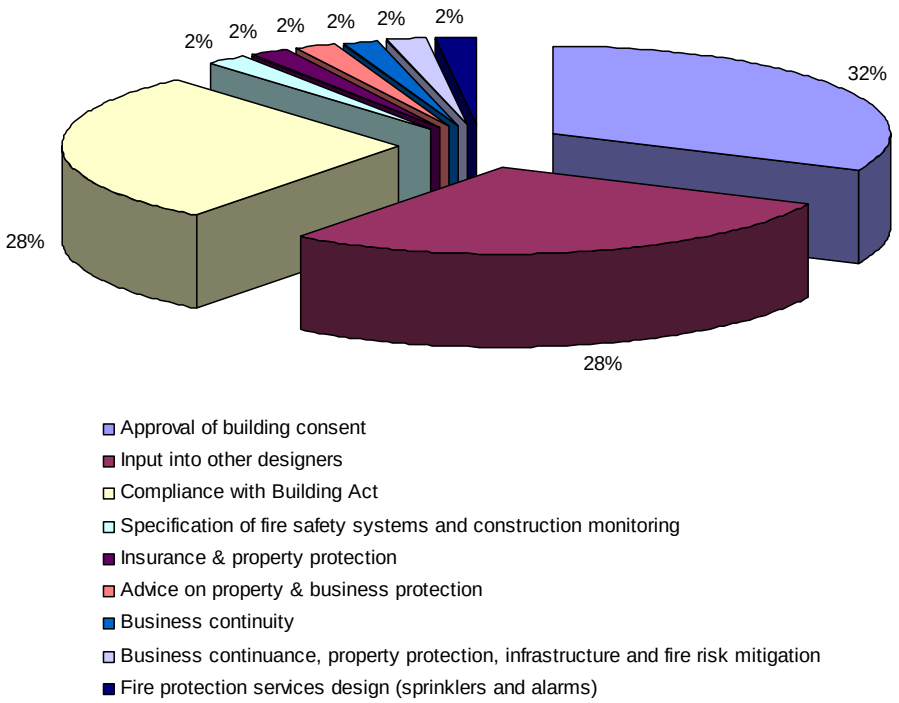


Figure 11.6: Responses to the requirements of the client's brief

The figures highlighted above account for where respondents mentioned several of the above items in a single questionnaire response. As such, the breakdown above has accounted for each response once and the totals were then calculated. From this total, the percentages of each response received were identified. Unsurprisingly, of the responses received, it is seen that the main requirement of the fire professional's brief from the client is to gain the

approval of a building consent application (32%). A further 28% indicated compliance with the Building Act and input into other designers. These responses highlight that the client's main expectation in engaging a fire professional is to primarily satisfy any compliance requirements with relevant legislation. A further expectation of the client appears to be that the fire professional engages with other design professionals involved in the same project. This in itself would provide further assurance to the client that any relevant legislative requirements will be met.

Six separate responses were also received in addition to the options initially provided. These constituted 2% of the total breakdown and are each highlighted in Figure 37 above. It is interesting to note that the common themes emerging from these are - property protection, business protection and continuance, and fire risk mitigation. Of note here is that although the New Zealand Building Code is a life safety orientated code, it is clear that the expectations of the client in engaging a fire professional extend beyond that ideal. Although the figures above are small in comparison to those relating to Building Consents and the Building Act, there is arguably an expectation of the client that compliance with the Building Act and relevant legislation, in addition to gaining building consent, therefore by default also provides for business continuity and fire risk mitigation.

It was surprising that business continuity and fire risk mitigation did not represent a higher percentage of expectation on behalf of the client. Of note therefore, is whether or not fire design provisions within buildings are meeting the client's full range of expectations, not just in regards to compliance with legislation, but also in terms of protection of their business and any associated fire risks. However, this is a larger question and in the absence of specific data and evidence to support this, such a view cannot be supported with certainty. In addition, this question lies outside of the focus of this report. Lastly, of note also is the little reference to the client expecting the fire professional to engage in construction monitoring services. This is further expanded upon below.

Question 6 - Is your organisation/firm involved in post consent site inspection and construction monitoring activities? What percentage of your overall work would this constitute? If no, please give some reasons why.

This question sought to gain information relating to whether or not fire professionals are engaged in post building consent site inspection and construction monitoring activities and if

so, to what extent. Figure 38 below highlights the breakdown of site inspection and construction monitoring work as a percentage of the respondent's workload. This figure outlines a percentage range that site monitoring work falls within along the x-axis and also provides the percentage value of the respondent's workload for that particular range.

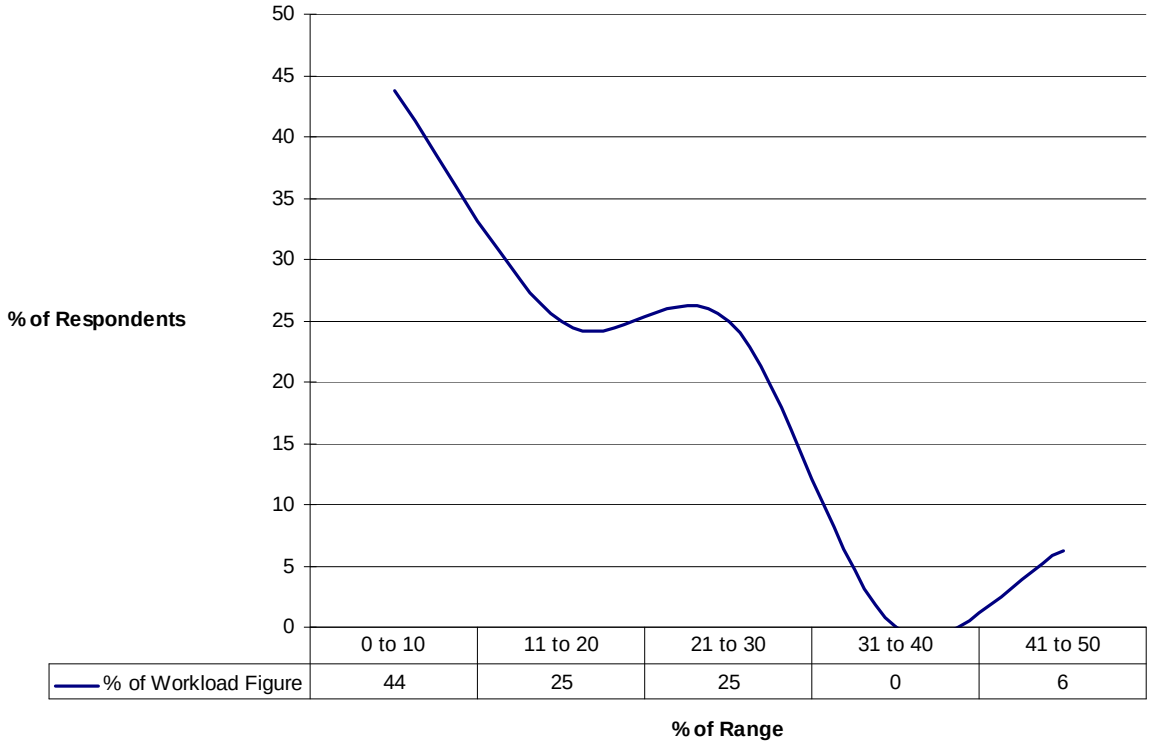


Figure 11.7 On-site inspection and monitoring as a percentage of workload

As can be seen from the results, 44% of respondents indicated that site inspection and construction monitoring activities constituted between 0% and 10% of their workload. This figure declines significantly as the percentage range of their workload increases. A further 25% indicated that it constitutes 11% to 20% of their workload as did the 21% to 30% range. No respondent indicated that site inspection and monitoring work accounted for 50% or greater of their workload. In all, 69% of respondents indicated that site inspection and monitoring work accounts for less than 20% of their overall workload. This figure jumps to 94% when considering the 0% to 30% range.

Respondents indicated that a main reason why inspection and monitoring work accounted for such a small percentage of their workload was that the client has not requested this as part of their brief and does not want to pay for this service in fee submissions. As a result the fire professional has therefore tagged this service as an extra to providing the main design

services. It was also indicated that most of their design jobs (<5%), have any site inspection content and such inspection work only accounts for one or two site visits. Some respondents indicated that site inspection work forms a consistent part of their ongoing workload whilst also providing some liability protection. At the same time, conducting such site inspection work is regarded as not being commercially viable. One respondent indicated that where performance-based design work is carried out, it always includes site inspections in order to ensure that specific design requirements are included.

It is surprising to note the responses in Figure 38 above. Overall, site inspection and monitoring work accounts for a very small percentage of the fire professional's workload. Although reasons for this relate to the client not paying for such a service and that most design jobs would only have minimal need for such work anyway, it could also be argued that commercial competition would also be a factor. Recent years has seen a consistent growth in the construction sector with demand for fire design expertise being high. It could be argued therefore that meeting the need of the client in regards to design work and associated costs would play a role in determining the ongoing work the fire professional is engaged in. In addition, respondents indicated that the provision of inspection and monitoring services are regarded as extras simply because the client does not with to pay for this and therefore is not built into the standard services being offered by them. A competitive market therefore, provides the client with a greater choice of service and associated costs.

In saying this, the fire professional plays a vital role in assuring that the fire design meets all legislative requirements and also the needs of the client. It is the author's view that surety in the design and construction process must also involve construction monitoring and inspection work to ensure design work is carried out correctly and appropriately on site. From the responses received, it appears that the majority of the involvement of the fire design professional in the building process is purely from a design office environment, with no confidence in the industry that design particulars are being carried out on site.

Question 7 - Should the NZFS be involved in a building design prior to consent? If Yes, what should this involvement be? (Only firefighting issues, Design criteria, Design methodology, Other (please specify)). If No, please specify why.

This question sought to investigate the view of respondents in relation to whether, in their view, the NZFS should be involved in a building design prior to consent. Respondents were

given three main criteria – firefighting issues only, design criteria and design methodology. Respondents were also given an option to provide any other areas that they feel the NZFS should be involved in. Figure 39 highlights the breakdown of responses received. It represents the percentage of the number of replies received for each option, not the total number of respondents i.e. the number of questionnaires returned.

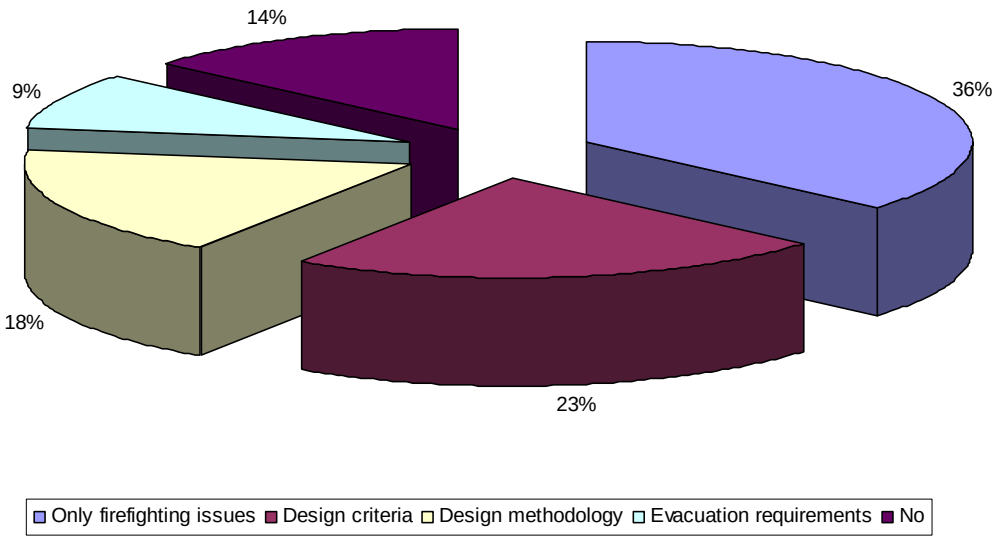


Figure 11.8: Involvement of the Fire Service in the design process prior to lodging of building consent

The responses highlight that the respondents felt the NZFS should mainly be involved in firefighting issues only during the design phase of a building prior to consent being lodged. Design criteria was the next area most represented, followed by involvement in design methodology.

Two respondents suggested that the NZFS should also be involved prior to consent in matters relating to the evacuation of the building's occupants in addition to those listed in the original question. It is unclear whether the respondents meant in the discussion of whether a building requires an evacuation scheme as per the requirements of the Fire Service Act 1975 (give reference here), but it is assumed that it relates to overall evacuation strategies included in the design process. The author has assumed the latter. However, generally speaking and in the experience of the author, fire engineering consultants are not normally contracted by the client to complete an evacuation scheme application on their behalf. Such work is generally

carried out by an evacuation scheme consultant, the building owner themselves or their nominated representative.

14% of the feedback received highlighted that the NZFS should not be involved at all in the pre building consent process. This is a surprising response given that the NZFS now have a statutory involvement in the Building Act in providing advice to Councils in respect of certain applications received by them for building consent. In addition, early consultation and involvement of key parties affected by the construction process would ensure relevant issues are brought forward and discussed early in the design phase of the building and prior to the lodgement of a building consent application. This involvement would add some surety to the design process and aid to minimise issues occurring after lodging building consent documentation.

Those that commented confirming that the NZFS should be involved in the design process provided a selection of comments to provide further clarity. Comments included:

- *Should only be firefighting issues - same as in Australia*
- *Where performance-based design occurs, they are a stakeholder so need to agree and sign off the FEB*
- *For design referred to the DRU (I.e. alternative designs) then they should be involved in the consent process*
- *For C/AS1 designs, it should only be for operational issues*
- *DRU should be involved prior to consent but not after consent application has been lodged*
- *Only if the Fire Engineer considers that their input to be appropriate and helpful*
- *Some NZFS believe that no possible/conceivable risk is acceptable, so it depends on whom you talk to. No objection to NZFS commenting on design criteria or methodology, but must be experienced in the consulting field not just theory*
- *Lessons learned from NZFS operations is fantastic and helpful, but no design criteria to work to for firefighting operations exists in NZ*
- *Building has to operate in evacuation mode therefore essential NZFS involved as they approve evacuation schemes.*

Those that represented the 14% of respondents indicating that the NZFS should not be involved in the building design process prior to consent provided a selection of comments as follows:

- *They add little if any benefit and since their involvement in 2004, buildings have not improved*
- *Many councils use DRU as their peer reviewer and this makes for a slow and drawn out process as all correspondence must go through the TA. Therefore the TA's are relinquishing their responsibilities as to what meets the Building Code and passing this to the DRU. This is not therefore an open, transparent process as the applicant is prevented from contacting the DRU*
- *DRU should check the building, not the design, for firefighting features and adequate means of escape. Reviewing the design is a policeman type process*
- *Would like to see the DRU review buildings (or proposed building drawings and specification) rather than the design of buildings (engineering calculation)*
- *The NZFS should not be involved in the process. They have had involvement in preparing the NZBC of which they have signed up to. If the building has been designed to the NZBC then they should be happy with it and the builder should not have the cost and time with the NZFS.*

Overall, 86% of respondents indicated that the NZFS should be involved in the building design prior to consent being lodged, but felt their involvement should be only in regard to specific items as referred to above.

Question 8 - In your opinion, what value does the NZFS provide to the building consent process? (None, Not very much, Some, A lot, Substantial)

This question sought to investigate whether the fire industry saw value in the inclusion of the NZFS in the building consent process as defined in the changes to the Building Act that came into force in 2004. Figure 40 below highlights the breakdown of responses received.

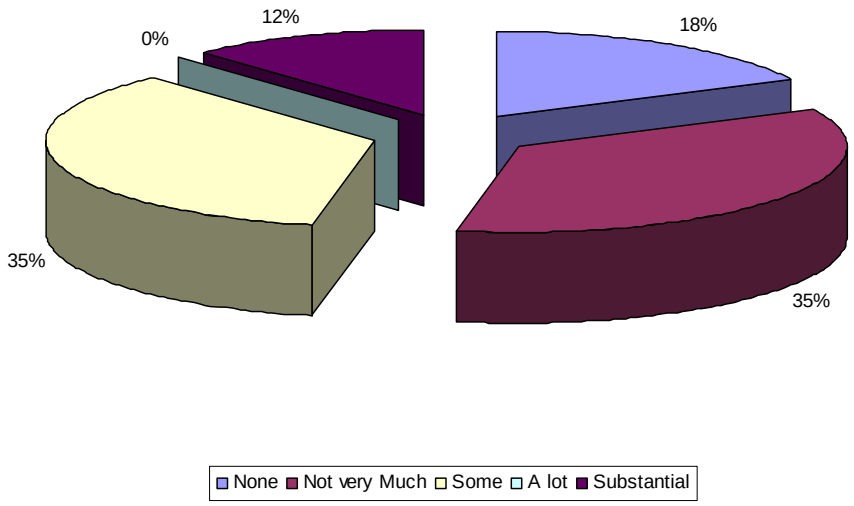


Figure 11.9: Value the NZFS brings to the building consent process

It is noted here that 53% of respondents view the inclusion of the NZFS in the consent process as providing none and not very much value. 47% responded that the NZFS brings some and substantial value to the process. However, although the majority of responses are negative towards any value being brought by the inclusion of the NZFS, comments included to clarify this view refer to the fact that it is the fault of the legislation rather than that of the NZFS for added value in the building consent process. A view was expressed that grossly inadequate fire designs are being accepted by BCA's due to them not possessing adequate fire engineering expertise to perform technical reviews prior to issuing building consent. Others expressed the view that the changes to the Building Act in 2004 have resulted in fire design not "moving outside of the square" and therefore more are choosing to follow the compliance documents, C/AS1. It is viewed that such an approach provides more certainty in the design process, whilst maintaining a reasonable timeframe for gaining a building consent. Feedback to this question also raised the view that the DRU should provide comment at the detailed design stage as BCA's are often not willing to do this. It was commented that this would remove much of the uncertainty that is felt exists in the current process. It was also commented that local NZFS personnel – regional fire engineers, Fire Safety Officers and operations staff provide, some value to the design process, but not very much overall by the DRU.

Question 9 - Do you find the memoranda issued by the NZFS are clear? (Yes, please specify, No, please specify)

The intent of this question was to gain some feedback on whether the memoranda issued by the NZFS are clear to those reading it. The memoranda are specifically written for BCA's and as such it is important that the contents of which are clear and easily understood. In addition, the memoranda are often passed to the design engineer for their attention and comment. Figure 41 below highlights the view of the respondents.

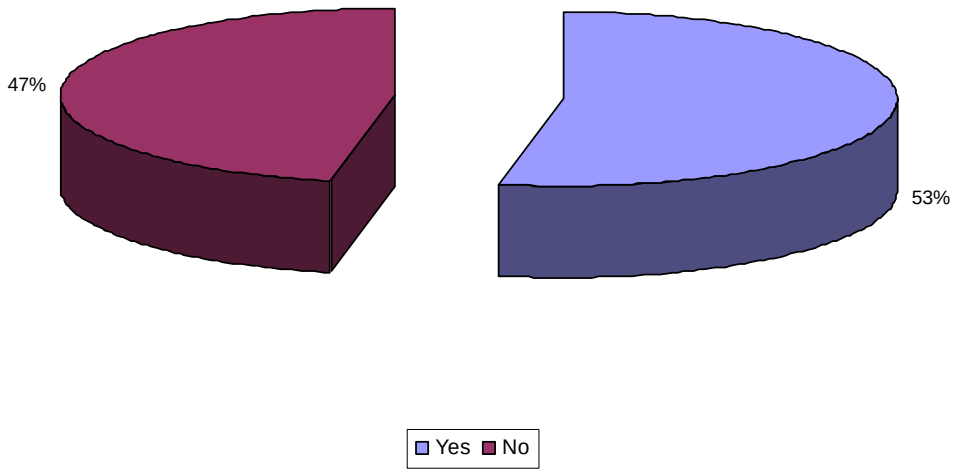


Figure 11.10: View of respondents as to how clear the NZFS memoranda are

Just over half of respondents believed that the memoranda are clear, with just under half disagreeing. Positive comments included:

- *They are set out well and their view well stated*
- *Yes with technical issues*
- *Yes, but often only deal with issues from their perspective*

Comments received with a negative bias included:

- *There is a lack in DRU consistency depending on who in the DRU has undertaken the review*
- *Technical applications and comments are not always correct*

- *Yes, but unintelligent emotional comments, they simply cannot understand how fire engineering design is done commercially.*

It is disappointing that no Councils responded to this questionnaire as their feedback in this regard, especially feedback in relation to the memoranda would prove useful to the NZFS. In addition, as comments provided by the NZFS can pertain to technical points of fire engineering, feedback from BCA's would have proven useful to the manner in which these comments are provided.

Question 10 - Do you find the memoranda issued by the DRU are useful? (Yes, please specify, No, please specify)

This question sought to determine whether the respondents felt the memoranda are useful to them. Figure 42 below highlights the breakdown of the responses received.

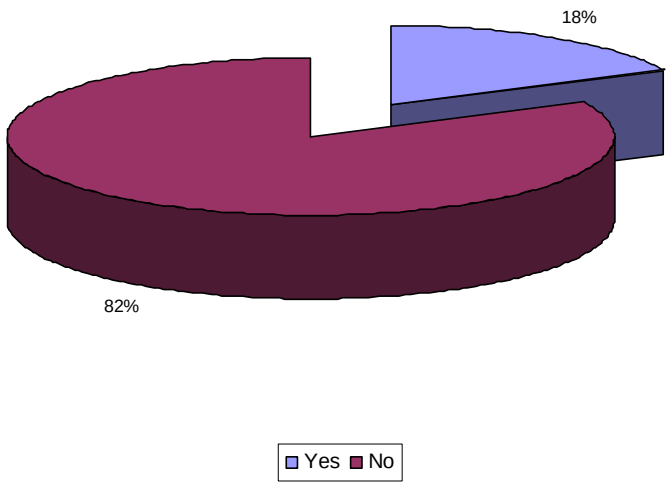


Figure 11.11: View of respondents as to how useful the NZFS memoranda are

18% of respondents indicated that the memoranda issued by the NZFS are useful to them, whilst 82% indicated otherwise. It must be highlighted, however, that again, responses from BCA's would have proved beneficial here in providing a more balanced representation of the fire industry's views. The figures above represent only one sector and in addition, it is not the sector for which the memoranda are written for. The memoranda are not aimed at the fire engineering consultants in the first instance. Rather, the advice contained in the memoranda is set out as per the requirements of the Building Act. It is the BCA's that are the recipients of

this advice and they must take regard for this advice in deciding upon whether to issue building consent.

In saying this, however, positive comments from respondents included:

- *Yes, but it would be nice to argue some points. Some TA's don't have the knowledge and just insist on compliance with DRU comments*
- *Can help to see how documents may not be so clear*
- *Sometimes they pick up items overlooked in the design process.*

Comments where a more negative view was conveyed included:

- *Memoranda are skim read and then contact BCA to tell them to dismiss the DRU's comments*
- *Are rarely relevant and often contradictory to what has been designed*
- *The DRU's memos typically result in very little change to the design but cost us sometimes thousands of dollars in correspondence convincing the TA that issues raised by the DRU are either way too conservative or are not in keeping with accepted industry norms. Typical examples are Rest Homes and Industrial Warehousing*
- *Authorities treat them as Bible. Comments don't appear to offer holistic views of acceptance so appear narrow-minded. No direct feedback is possible*
- *Unhelpful in existing buildings. DRU don't take into account reasonably practicable. It is assessed as if it were a new building*
- *Fail to appreciate holistic fire design or reasonably practicable concept.*

It is interesting that the reasonably practicable point is raised as a negative remark concerning the contents of the NZFS memoranda. Determining whether the provisions of reasonably practicable, as outlined by the Department of Building and Housing[16] is solely a matter for the BCA to consider in determining whether or not a building consent should be granted based on the documentation submitted as part of a building consent application.

Question 11 - Do you find the memoranda issued by the DRU are informative? (Yes, please specify, No, please specify)

This question sought to determine whether the respondents felt the memoranda are informative. Figure 43 below highlights the breakdown of the responses received.

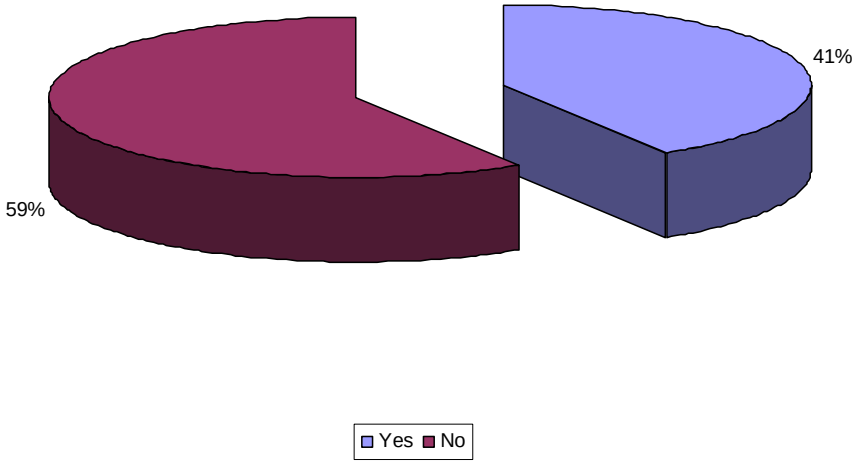


Figure 11.12: View of respondents as to how informative the NZFS memoranda are

The results obtained above highlight that just over half of the respondents indicated that they felt the memoranda are not informative, with less than half indicating otherwise. In addition, more feel the memoranda are informative than they are useful, in comparing the responses received to question 10 above. It must be noted here also that the responses received for this question represent only one sector within the fire industry. Responses from the fire consultants sector whilst beneficial, does not give a rounded view of the industry and especially from those whom the memoranda are intended for. However, those that responded positively to this question included comments such as:

- *In some circumstances they find minor errors which are beneficial*
- *Bits of them are*
- *Explain why they ask for something*
- *They certainly spell out how the DRU interprets various clauses of C/AS1*

- *DRU comments are often limited to C/AS1, where these designs are not C/AS1 compliant, while useful, they often don't take into account specifics of the building and project. This really only applies to designs forwarded by the TA to the DRU where the NZFS has not been involved in the FEB process, where these matters would generally have been resolved prior to consent application.*

Comments where a more negative view was conveyed included:

- *Suggestions on how to improve the submission would be appreciated, rather than just stating what is wrong*
- *Do not identify anything we already know*
- *I find them very repetitive*
- *Suggestions on how to improve the submission would be appreciated, rather than just stating what is wrong*
- *Only in so far as to see the DRU have a general lack of commercial fire engineering design knowledge*
- *They need to get out of their office and discuss real issues with owners, architects, designers and deal with real issues.*

It is interesting that feedback included that where the NZFS was not involved in the fire engineering brief process that issues have arisen subsequent to lodging a building consent application. In addition, respondents do support the involvement of local Fire Service personnel – regional fire engineers, Fire Safety Officers and operational staff. A distinguishing point here appears to be that fire engineering consultants can approach local Fire Service staff prior to consent and gain agreement on certain design approaches, acceptance criteria etc, whilst feedback from the DRU is impersonal with no opportunity for further involvement of the design engineer once a building consent application has been submitted. Whilst this may be the case, it is the author's view that documentation submitted for building consent should outline fully to the BCA all design particulars and demonstrate clearly how compliance with the building code has been met. Should further information or a peer review be deemed necessary, this is the prerogative of the BCA.

Question 12 - Do you find the fire-fighting facilities checklist developed by the NZFS useful to your work? (Yes, please specify, No, please specify)

The NZFS has developed this checklist to assist the design community to consider and account for, Fire Service requirements early in the design process. This checklist was designed also to assist the BCA's in processing a building consent application. Although not a document specifically required by legislation as part of the building consent process, it would also assist to quicken the response from the DRU to the BCA as firefighting matters would have been demonstrated to have been discussed with the local Fire Service personnel and any agreements signed off and recorded. Figure 44 below highlights the responses received to this question.

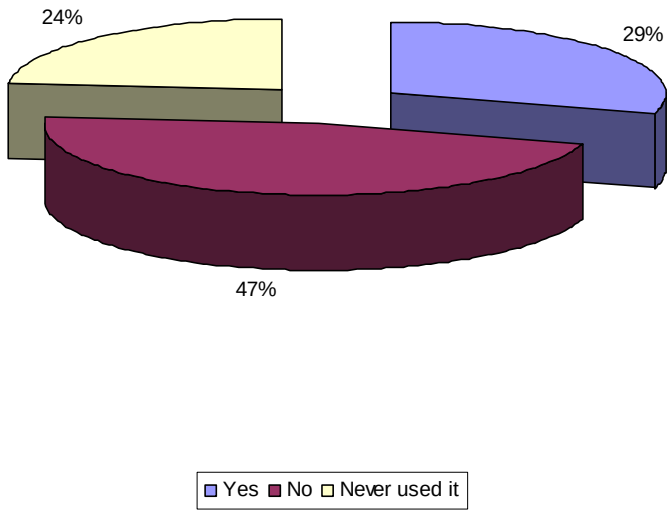


Figure 11.13: Is the Firefighting Facilities Checklist useful to your work?

Almost half of respondents indicated that they did not feel that checklist was beneficial to their work, with almost one quarter stating that they had never used it. 29% of respondents confirmed that the checklist proved useful to their work. As no respondents represented the BCA's, a more widespread view of the fire industry could not be obtained. Although the checklist was originally created for the design community, the contents of it, if used properly was also intended to assist both the BCA's and the DRU in carrying out their work more efficiently, thereby saving more time in the building consent process.

Positive comments relating to the checklist included:

- *Useful for the client and the architect to ensure they have included everything*
- *Useful for the client and the architect to ensure they have included everything. Helps to include it in the building consent application information sent to the DRU to speed up the process*
- *To demonstrate to the DRU that the designer has consulted with the local branch of the NZFS*
- *Guide to Fire Service Operations in Buildings [17] document is very useful too.*

More adverse comments included:

- *The FFFC is not applicable to the vast majority of projects & are not really the building owner's concern*
- *Most points are already covered in our fire reports anyway*
- *Local Fire Safety Officers won't fill them in.*

Although this checklist is not a required piece of documentation for building consent documentation, the manner in which the information contained within this form can be utilised appears not to be widely agreed upon. There needs to be willingness on behalf of the design community to use it and engage in local discussions with not only Fire Service representatives, but also with other stakeholders in the construction project, if it is to assist in the building consent process. Discussions with the Fire Engineering Manager has confirmed that where this checklist has been used and signed off, it provides the DRU and BCA's with important information relating to firefighting matters and assists both parties significantly in the review phases of the consent process, impacting on the overall time for issuing a building consent.

Question 13 - Do you find engaging in a Fire Engineering Brief (FEB) process with the NZFS useful and beneficial to your work? (Yes, please specify, No, please specify)

The International Fire Engineering Guidelines (IFEG) were introduced into New Zealand by the Department of Building and Housing in May 2005. In doing so, they outlined an approach and methodology for fire design that would allow all relevant stakeholders in the building design process to meet and discuss matters and potential issues relating to the project prior to the building consent being lodged. This question sought to gain some feedback as to whether engaging in a fire engineering brief process with the NZFS has proved beneficial to the work of the respondents. Figure 45 below highlights the breakdown of responses.

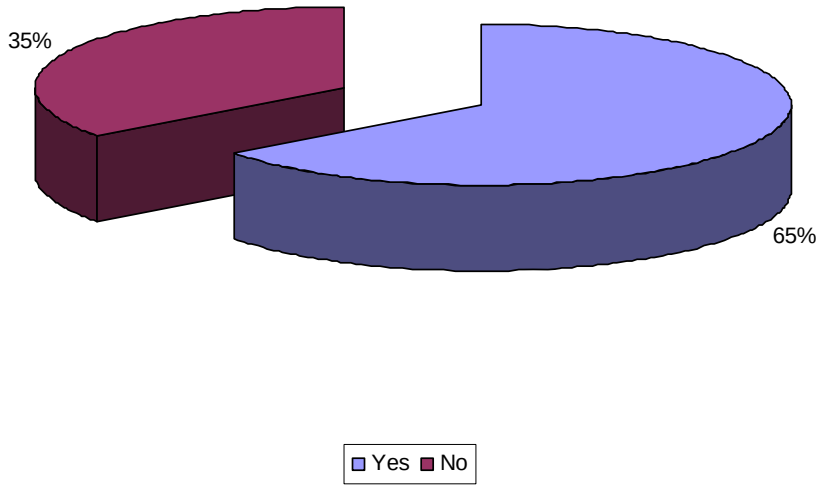


Figure 11.14: Engaging in the FEB process with the NZFS

The results above highlight that almost two thirds of respondents feel that engaging in a fire engineering brief process with the NZFS has been beneficial to their work. 35% felt otherwise. The fire engineering process involves local Fire Service personnel and may include representation from regional fire engineers, Fire Safety Officers and operational staff. Positive comments from the respondents supporting this process included:

- *Yes, but sometimes local restrictions make its use limited e.g. water supply deficiencies in the area*
- *Offers a level of certainty to our fire design proposals and agreed strategies and methodologies*
- *Depends on design complexity. It is very useful to ensure all issues are resolved before the building design is finalised*
- *On a local level with the NZFS is very useful and we endorse the method and present process.*

Opposing views included:

- *It is a total waste of time*
- *These meetings can be very time consuming, especially when projects change. One-on-one, face-to-face meetings with the NZFS work the best*

- *Find it adds little value and adds significant costs to the developer as the process can be too drawn out*
- *Works well in Australia as this is the consultative process there. In NZ the legislation means the DRU cannot be consulted in brief prior to consent, so a FEB is useless to NZFS in NZ. I do use them with peer reviewers, which works well*
- *Prevents hold-ups, but local staff can change their mind – Fire Safety Officers.*

Overall, the feedback received is reasonably positive. There appears to be some disquiet regarding NZFS local staff changing their position on certain matters during the FEB process. Although respondents did not provide any further detail, opportunities may exist for more consistency when local NZFS personnel entering into a FEB process.

Of note also is the positive comments relating to the respondents engaging with local Fire Service personnel and confirming that engaging in an FEB process does serve to identify potential issues and ensure these are dealt to prior to lodging documentation for building consent. Although this process is outlined in the IFEG and is not a mandatory one, it requires the willingness of all relevant parties to enter into the process and work in a collegial way for the benefit of the client and for the building's occupants. In addition, this process addresses any specific issues relevant to emergency service personnel.

Question 14 - Any other comments you would like to add?

Some respondents chose to provide additional comments whilst others did not. The comments provided were mixed in regards to whether the changes to the Building Act in 2004 have provided any real value to the building consent process. Those who feel it has not, were of the view that the inclusion of the NZFS (i.e. the DRU) has merely added an extra level of bureaucracy and cost to the consent process and questioned the value in such a change to the legislation. The inclusion of the DRU and the provision of their views on the building consent applications to Councils were also questioned due to their opinion that as a result Councils are not thinking for themselves and are accepting the comments made by the DRU outright and not questioning their validity. As a result some respondents to the questionnaire felt that they should be allowed to communicate directly with the DRU reviewer and discuss the design work submitted for consent to Councils and therefore resolve any matters of dispute. Other respondents indicated that DRU comments are actively ignored

by some Councils. In addition, one respondent indicated that they now include a standard paragraph when replying to Councils, stating that DRU comments are not binding and do not constitute a peer review.

Some respondents expressed their view of being very disillusioned with the design process since 2004. It was felt that risks involved in completing working drawings before receiving comments from the DRU are just too great, firstly for the project and secondly for the fire consultant. Their view is that the result of this is generally a C/AS1 design and it is felt by some respondents that there is no longer any real initiative in performance based fire design. One respondent expressed their hope that eventually there would be a verification method for fire design or even a NZ standard. In addition, having defined or generally accepted levels of risk in the Building Code and industry was also highlighted as being helpful in order to define a level of safety and hence "safe designs". Overall, the tone of the more negative feedback was that the DRU comments were unreasonable and at odds with how fire engineering is commercially undertaken. That being said it was also pointed out that the DRU are only doing what the BCA's should be doing themselves.

Positive comments were also included in the additional remarks provided. One respondent commented that consultation with local NZFS has continued despite their frustrations with the building consent process. Another felt that the DRU has improved the fire engineering solutions in the industry as the TA's do not have the experience or skills to judge alternative designs. The DRU was also noted as having a lot to offer the fire engineering profession, but that the review process needs to be improved to realise these benefits.

12 DISCUSSION

12.1 DRU consents

The national trend of the total number of building consents forwarded to the DRU since 2005 highlights an upward trend until 2008, where a decline in numbers is evident. In comparison, when the three centres of Auckland, Wellington and Christchurch were looked at, all three are no showing declines in the number of consents being forwarded to the DRU for review. Although this is the case, it must be noted that the overall national figures incorporate the remaining 72 BCA's across New Zealand.

Of note is that the number of consents forwarded by Christchurch City Council is well below that of the other two centres. In saying that, Christchurch's annual totals have increased each year since 2005, peaking in 2007. Of note also is that the numbers of consents forwarded by Wellington City Council is unexpectedly high and is the highest of all three Councils. Although the number of consents forwarded by Auckland City Council rose steadily from 2005, the number of consents forwarded to the DRU has continued to decline since.

On face value the total number of consents nationally has increased in 2006 and 2007 with a decline evident in 2008. A more significant trend, however, is evident in the three main cities. All three show a decline in the number of consents being forwarded to the DRU. However, the numbers of non-residential building consents received by these councils has seen a continuous increase since 2005. The exception to this has been Christchurch City Council where a decline in non-residential consents was seen in 2008. Although it may be a little early to conclude that a decline in performance based design is therefore the result, the evidence certainly points to this beginning to occur in the main cities. Several more years of data would be needed in order to confirm with certainty. In addition, results of the DRU consent numbers referred to above, the non-residential consent numbers and the feedback of the fire industry questionnaire appear to substantiate this decline.

12.2 Non-residential building consents

The national monthly non-residential building consent figures have shown to increase consistently since 2005, with this growth showing a higher rate of growth in early 2007. However, the percentage of consents that are forwarded to the DRU on a national basis is seen to show the opposite trend and decrease consistently since April 2005 when the DRU commenced operating. Early 2007 was the exception to this trend where an increase in the percentage of consents sent to the DRU was seen. This coincided with the jump in the national totals in the same portion of the year.

Auckland, Wellington and Christchurch City Councils all showed an increase in the non-residential building consents received since 2005. The percentages of the non-residential consents forwarded to the DRU by Auckland and Wellington City Councils show an overall decrease and match the trend seen nationally. The trend for Christchurch is less evident but the numbers of non-residential consents have increased each year since 2005, with 2008 seeing the first decline. The percentage of consent sent to the DRU from Christchurch City appear to show a general increase in 2005 and most of 206, but since that time, the percentages appear to be lower overall, but no consistent trend is evident.

Of note is that Wellington City Council have forwarded more consents to the DRU than they are receiving when compared to the data from SNZ. This is seen to occur more in 2005 than in subsequent years, but has occurred in 56% of months since 2005. This is unexpected and suggests that perhaps a lack of understanding of the requirements of the New Zealand Gazette Notice 56 in the early stages of the Building Act changes could have been a factor. That being said, however, this situation has been repeated in 2007 and loess so in 2008. This situation has not arisen for either of Auckland or Christchurch City Councils.

Overall, a consistent increase in the number of non-residential building consents is evident since 2005. The percentage of these consents that are referred to the DRU is seen to be declining on a national basis. This is also seen to be the case for each of the main centres. The results certainly point to a decline in the involvement of the DRU in reviewing non-residential building consents both on a national totals basis and also in data relating to Auckland, Wellington and Christchurch City Councils. The national and regional centre

growth in consent numbers is not reflected being in numbers of consents being forwarded to the DRU.

12.3 Audit reports

The audit reports provided to the Commission highlight deficiencies in the standards of fire engineering designs reviewed. They concluded that of the reports reviewed, alternative solutions were not done well, nor were they justified or properly documented. The use of engineering judgement was prevalent in most reports and technical matters were discussed rather than demonstrated. The use of computer modelling was also highlighted as being of concern with very little assessment of outputs and results evident.

The DRU's comment's in relation to these reports were viewed as appropriate by the auditors in most cases reviewed, yet some of the questionnaire feedback received from the design community blames the advice from the DRU for the problems in the building consent process and for incurring delays in building consent applications and adding additional cost to the process. It is difficult to understand this view point as although in some cases designers are questioning the validity of the DRU's comments, the majority of which have been substantiated by the views of the authors.

In addition, there is no mechanism currently in place in New Zealand for feedback to be given to the DRU as to whether the advice given by them has been adopted or otherwise by the BCA in determining a building consent application. It can be concluded on the basis of the results of the DRU audit, however, that the DRU is discharging its duties outlined in the Building Act in a technically competent manner.

12.4 Professional qualifications and memberships breakdown

The breakdown of the professional qualifications and memberships held by the designers whose fire engineering reports were subject to the DRU audit present very worrying results. Even though the auditors took as wide a sample of building projects, designers and DRU reviewers as possible, uncomplimentary feedback provided in the audit reports is consistent

across the majority of the designs reviewed, irrespective of professional qualifications or industry memberships.

Of note is that most designers held a Masters Degree in fire engineering and in addition, held membership to a national or international body. It is noted also that 12% of the reports reviewed were compiled by individuals with no qualifications or professional memberships. Where designers held membership to IPENZ, gaining membership would have required the individual to undergo a competency assessment in order to secure their membership and therefore adopt the postnominals of MIPENZ. It is acknowledged that these competency assessments may have been relevant to the individuals' undergraduate qualifications and experience at the time they were assessed. Nevertheless, the results highlight a compelling need within the fire industry in New Zealand to ensure those practicing in the discipline of fire engineering are suitably qualified, are continually assessed as being competent in their field and that adequate restrictions are implemented to prevent any individual from practicing outside of their area of expertise and carrying out performance based design work.

Although a performance based building code has existed in New Zealand for some time now, it must really be questioned whether this has resulted in leading edge performance based design work. It is acknowledged that the audit reports do not represent the entire fire industry, however, the results raise questions as to the current state of the industry.

12.5 Industry questionnaire

The fire industry questionnaire highlighted an overall disquiet amongst members of the design community in relation to the changes in the Building Act brought into force in 2004. Feedback suggested that these changes have introduced more restrictions in the building consent process and that greater bureaucracy is now preventing building consent being approved with ease. Although some feedback specifically referred to the involvement of the DRU in contributing to this, others feel that the legislation is inadequate and has created more problems than it has solved.

Of note is the relatively little on site inspection and monitoring forming part of the respondents' workload. Respondents indicated that the reluctance of the client to pay for this

service is the reason for why it accounts for such a low percentage if their work. Although that may be the case, this highlights a deficiency in what the author believes is a critical component to ensuring all performance based design measures fire design aspects are accounted for in the construction project. There is therefore very little assurance that these specific design aspects are translated to the final building works. It was an interesting point therefore, when respondents indicated that their client's briefs also related to business continuity, property protection, fire risk mitigation and fire protection services design work.

The IFEG were also cited the most as the guidance documentation and methodology used. That being said, however, discussions with the NZFS Fire Engineering Manager indicate that very few building consent submitted to the DRU, follow the process contained within this document, nor are fire engineering briefs included as part of the consent documentation. It is acknowledged here, however, that a fire engineering brief can comprise of an e-mail trail for smaller building projects.

Whilst the majority of respondents supported the NZFS being part of the building consent process, most felt that it should only be in relation to firefighting and evacuation aspects. Few felt a need existed for design review work as this is work that the BCA's should themselves be doing. Support was forthcoming for the involvement of the NZFS at the pre building consent stage and felt that discussions with local NZFS staff were beneficial and were of benefit to the design process.

A mixture of feelings was evident in relation to the DRU memoranda with both positive and negative views expressed. Of note, however, was the support for additional guidance from the NZFS such as the Guide to Fire Service Operations in Buildings. In saying that, however, respondents to the questionnaire did not see value in using the firefighting facilities checklists. It was viewed as a non-mandatory piece of documentation, rather than one which when used in consultation with the NZFS, would aid the building consent process and DRU advice.

When asked whether the changes to the Building Act in 2004 resulted in any changes to the percentages of performance based design work they were undertaking, respondents indicated that they are now engaging in less performance based design work. Difficulties and associated time delays in gaining building consent were cited as the main reasons for this.

Difficulties centred around the BCA's not assessing performance based design work themselves and relying on the comments provided by the DRU being addressed in full prior to issuing building consent. In addition, respondents indicated that they did not agree with the comments supplied by the DRU and felt that they were at odds with the manner in which fire engineering design is carried commercially. Failure in the process to allow the designers to enter into dialogue with the DRU was also cited as contributing to the difficulties and frustrations. Percentages in of respondents' workloads that comprised of performance based design work after the 2004 Building Act changes, were seen to show greater representation in the 0%-10% and 11% to 20% ranges than before the changes, with a decrease evident in higher ranges.

Overall, whilst there is positive feedback in some cases, few respondents indicated support for the changes to the Building Act. Although support is evident for the need to implement a streamlined design and building consent process, there appears to be a considerable gap between the feedback the DRU are providing in their memoranda and that of the views of the design community. This is further compounded by the contents of the audit reports.

13 CONCLUSIONS

The figures highlighted by the consent applications being sent to the DRU for review show an increasing national trend with the exception of 2008, but a decline in the Auckland, Wellington and Christchurch centres. The non-residential building consents received by the BCA's since 2005, point to a consistent increase and this is also reflected in the figures received by the three main centres. Thus, despite strong growth in the non-residential sector, this is not reflected in the work seen by the DRU. Inconsistencies in determining the requirements of Gazette Notice 56 appear to remain within the industry.

The audit reports point to significant deficiencies in the manner in which fire engineering is being conducted, yet the majority of the authors of the reports held a professional qualification and were members of a professional body to which competency assessments apply. In addition, it was observed that 12% of the authors of the reports held no relevant qualifications in fire engineering nor held membership to a professional body. They do, however, confirm that the DRU is performing its work competently. Restrictions within the fire industry in relation to who can perform fire engineering design work certainly require a more formalised structure around it in order to maintain robust industry standards and high competency levels of those practicing within it. Further audits of the DRU are necessary, with any feedback to the industry requiring consistent and proactive measures being put in place for the benefit of the industry as a whole.

The questionnaire feedback highlighted a distinct difference in the views of the fire engineering consultant to that of the auditors and that of the DRU in regards to what is considered industry best practice in carrying out performance based fire engineering design work. Difficulties in the building consent process and feedback from the DRU are highlighted by respondent as the main reasons that designers are now opting for less performance based design work.

Whilst the NZFS are seen as being of benefit to the building consent process during the design phase, documentation adopted as industry best practice in New Zealand as well as that developed by the NZFS, does not appear to be utilised to the extent that it could be. Moreover, efforts made by the DBH and the NZFS in promoting these guidelines and

documentation appear to have had little effect, with only a small percentage of designers actively utilising them. Further promotion within the industry of industry best practice guidelines is warranted. In addition, some guidance produced by the NZFS is regarded by the design community as being very beneficial to the industry. It is recommended that the NZFS seek opportunities for providing continued guidance. This will aid the BCA's who are struggling when assessing performance based design work and are relying on the NZFS for assistance whilst at the same time enhance relationships within the industry.

BCAs hold a key role in preventing substandard design work from being accepted. However, in order to be more robust in this decision making, greater assessment abilities, procedures and knowledge are required. In addition, there is a need within the industry for BCA's to provide feedback on memoranda received from the DRU on the actions taken by the BCA's in determining building consent applications following receipt of this advice. This will assist in providing greater transparency and consistency in the decision making process.

Overall, the evidence is pointing to a decline in the levels of performance based design work being carried out in New Zealand. Although New Zealand has experienced growth in the construction sector in recent years, this growth is not being represented in the corresponding numbers of building consent sent to the DRU and is confirmed by the responses to the questionnaire.

It is the author's view that changes to the Building Act in 2004 does represent the beginning of positive change for the fire industry although it is recognised that this change may be over a longer term. There is certainly room for more robust procedures at the BCA level with opportunities for a more collaborative design process and involvement of key stakeholders warranted

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15 APPENDICES

15.1 APPENDIX 1: New Zealand Gazette Notice 56

Notice That Copies of Certain Applications for Building Consent Must be Provided to the New Zealand Fire Service Commission

Pursuant to section 46 (1) of the Building Act 2004, I give notice that copies of the following kinds of application for a building consent must be provided to the New Zealand Fire Service Commission:

1. An application for a building consent that relates to building work to be carried out in respect of any type of building or part of a building described in section 21A of the Fire Service Act 1975 regardless of whether the building or part of the building is sprinkler protected.
2. For the purpose of clause 1, an application for a building consent for building work means an application:
   (a) where compliance with clauses C1-4, D1, F6 or F8 of the Building Code will be established other than by compliance with the provisions of an applicable compliance document; or
   (b) that involves a modification or waiver of clauses C1-4, D1, F6 or F8 of the Building Code, under section 67 of the Building Act 2004; or
   (c) that involves an alteration, change in use or subdivision and affects the fire safety systems, including any building work on a specified system relating to fire safety, except where the effect on the fire safety system is minor.
3. Clause 1 does not apply to an application for a building consent for building work to be carried out in respect of:
   (a) single household units;
   (b) buildings in which every fire-cell is a household unit separated vertically from the other fire-cells, and each fire-cell has independent and direct egress to a safe place outside the building;
   (c) an internal fit-out, unless the fit-out relates to a change of use under clause 2 (c);
   (d) outbuildings or ancillary buildings.
4. This notice comes into force on 22 April 2005.

Dated at Wellington this 14th day of March 2005.

KATRINA BACH, Chief Executive, Department of Building and Housing.

15.2 APPENDIX 2: Design Review Unit – Tier 1 Review Checklist

Design Review Unit – Tier 1 Review Checklist

Note: Sections 1 – 7 to be completed on Day 1

1. Job Details

Job number		Priority	
Job name			
NZFS Fire Engineer			
Date in		Day 8 date	
Date out		Approved (Yes/No)	

2. Quality Assurance

	Date	Signature
Day 2 check		
1st review		
Memo Review		
Manager Review		

3. Designer Details

Fire Engineer	
Qualifications	
Company	
Architect	

4. Project Details

New Building	Alterations and Additions	Alterations	Change of Use (Sleeping)	Change of Use (Non-sleeping)

5. Building Details

No. of floors		Max. escape height					
Footprint (m^2)		No. of occupants					
Special hazards		Building FHC	1	2	3	4	

Water classification	W1	W2	W3	W4	W5	W6	W7	W8

Sprinklers	None		NZS 4541		NZS 4515		
	Appendix D		Non-compliant		Other:		

Classified use	Housing		Community res.		Community non-res.		
	Commercial		Industrial		Out building		

6. Consent Documentation

Information	Yes	No	N/A	Information	Yes	No	N/A
Consent application form				Elevations (each face)			
Fire report				Sections			
Specifications				Mechanical services			
Site plan				Electrical services			
Floor plans (all levels)				Door schedule			
Fire safety drawings				Window schedule			
Fire safety drawings location:		Fire report			Architectural plans		

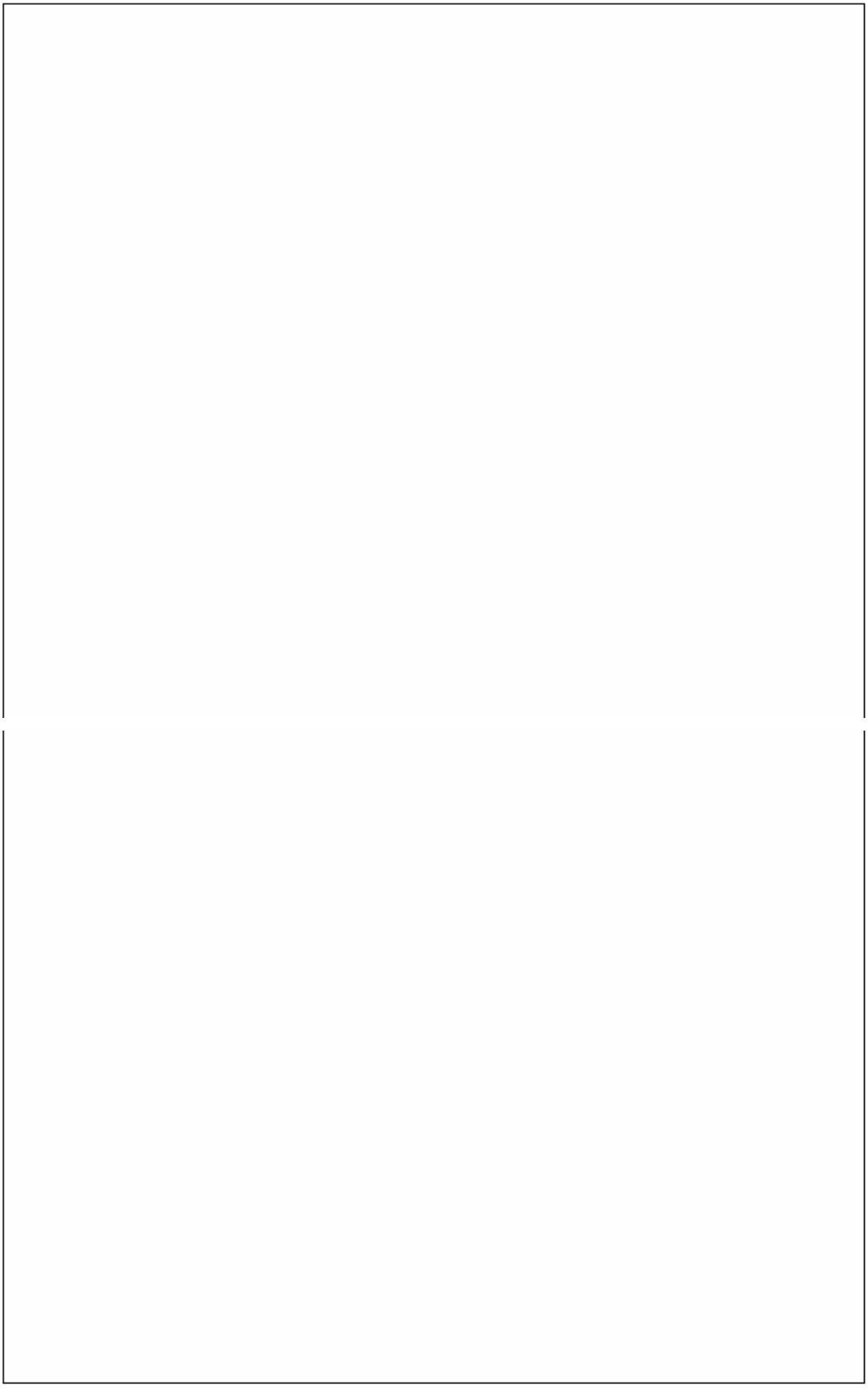
7. DRU Considerations

Reason for DRU Memo:
If alteration, identify extent of work in relation to size/value of building:

	Yes	No
Does design refer to the acceptable solutions?		
Is the building fully sprinklered?		
Do the drawings referenced in the fire report match those of the building consent?		
Are the hours assigned to this job correct?[1]		
Is there sufficient information to carry out an assessment of the design?[2]		

Note1: If hours are not correct, reassign priority with Administration Manager
Note 2: If more information is required, memo must be sent by Day 3

8. Preliminary Notes



9. Fire Safety Precautions
(C/AS1 Table 4.1)

Firecell	Description						PG	FHC	OL	EH
	F									
C/AS1										
Provided										
Notes										

Firecell	Description						PG	FHC	OL	EH
	F									
C/AS1										
Provided										
Notes										

Firecell	Description						PG	FHC	OL	EH
	F									
C/AS1										
Provided										
Notes										

C/AS1 deletion	Alternative solution	Justification provided	Adequate	
			Yes	No

10. Escape Routes (C/AS1 Part3)	Adequate			
	Yes	No	N/A	Reference
Number (refer C/AS1 Table 3.1)				
Separation (min. 8 metres clear separation)				
Height (min. 2100 mm)				
Width (refer C/AS1 Table 3.2)				
Length (refer C/AS1 Table 3.3)				
Length increase for FSPs (refer C/AS1 Table 3.3)				
Door opening direction (max. 10-EW; 20-OP against flow)				
Fixed seating				
Escape via adjacent firecell				
Escape via adjacent building				
Escape via intermediate floor				
External escape route				
Single means of escape				
Escape from basement level/s				
Vertical safe path				
Intermediate floor (length 1.5 times actual)				
Crowd large purpose group				
Sleeping purpose group				
Revolving or sliding automatic doors				
Windows used for escape				

11. Requirements for Firecells (C/AS1 Part 4)	Adequate			
	Yes	No	N/A	Reference
Floor area limits (unsprinklered buildings)				
15% roof ventilation for unlimited floor area (single floors)				
Multiple firecells (determine FSPs for whole building)				
Early childhood centre				
Mezzanine floor escape height for determining FSPs				
F rating reduced for sprinklers **not required under Table 4.1**				

12. Fire Resistance Ratings (C/AS1 Part 5)	Adequate			
	Yes	No	N/A	Reference
F ratings applied to firecells as per C/AS1 Table 4.1				
S ratings applied to all external walls without 100% U.O.				
S ratings calculated correctly (C/AS1 5.5.2 and Table 5.1)				
A_f includes intermediate floor area				
Concessions for single firecells with multiple PGs				
Firecells with FHC 4				
Higher FRR applied to both sides of firecell separation				
FRR applied to primary elements supporting fire separation				
FRR applied to both sides of external wall (C/AS1 5.7.6)				
Specific minimum FRR requirements (C/AS1 5.7.9)				
Glazing in fire separations				
Primary element stability				

13. Control of Internal Fire and Smoke Spread (C/AS1 Part 6)	Adequate			
	Yes	No	N/A	Reference
Fire separation between firecells rated F0				
Purpose groups CS and CL				
Purpose group CM				
Purpose groups CO, CS and CL				
Purpose groups SC and SD				
SC and SD group sleeping areas				
SC and SD suites				
Operating theatres, delivery & recovery suites, intensive care				
Purpose group SA				
SA group sleeping areas				
SA suites				
Purpose groups SR and SH				
Exitways (purpose group IE)				
Ventilation in enclosed exitways for SC, SD, SR and SA				
Smoke control for vertical safe paths exceeding 25 m				
Support activities (purpose group IA)				
Enclosed solid waste storage areas				
Car parking				
Purpose group ID (intermittent activity – medium fireload)				
Plant, boiler and incinerator rooms				
Each floor a separate firecell (exemption C/AS1 6.14.1)				

Firecell construction details				
Long corridor subdivision (40 m for OP & PP, 80 m for SP)				
Intermediate floors				
Basement floors				
Subfloor spaces				
Protected shafts				
Concealed spaces				
Unsprinklered firecell roof/ceiling space area restrictions				
Closures in fire and smoke separations				
Lift landing doors				
Interior surface finishes				
Foamed plastic building materials				
Exitway pressurisation				
Smoke control for intermediate floors				
Limited area intermediate floors				
Limited area atriums				
Smoke detection interface with smoke control system				
Smoke control in air-handling systems				
Emergency power for smoke control systems				

14. Control of External Fire Spread (C/AS1 Part 7)	Adequate			
	Yes	No	N/A	Reference
Horizontal fire spread to other property				
Horizontal fire spread to adjacent sleeping PG buildings				
Horizontal fire spread to external safe paths				
Separate legal titles				
Calculation method (dependant on building/boundary angle)				
Wing walls and return walls				
Sprinkler concessions for Methods 2 and 3				
Horizontal fire spread from roofs and floors				
Horizontal fire spread from open sided buildings				
Vertical fire spread from roofs				
Vertical fire spread in same building (if unsprinklered)				
Roof car parking and storage				
Specific requirements for FRRs of external walls				
Exterior surface finishes				

15. Fire Fighting (C/AS1 Part 8 and NZBC C3.3.9)	Adequate			
	Yes	No	N/A	Reference
Fire Service Vehicular Access				
Special provisions for SC and SD purpose groups				
Fire Service access to building				
Fire hydrant system				
Fire sprinkler system				
Fire alarm panel				
Fire systems centre				
Fire Service lift control				
Voice communication system				
First aid firefighting				

16. Performance Based Design	Adequate			
	Yes	No	N/A	Reference
ASET input variables				
RSET input variables				
Computer fire model suitable for application				
Computer fire model used within validation limits				
Computer fire model input variables				
Computer evacuation model suitable for application				
Computer evacuation model used within validation limits				
Computer evacuation model input variables				
Eurocode method for S rating calculations				
NZS 4203 Load Combination 7 post fire structural loading				
Use of non-fire rated doors in fire separations				
Tilt slab construction (release mechanisms/gap sealant)				
Staged evacuation scheme proposed				
Does escape route pass through other tenancies				

Notes

Include in memo

Reference		Issue:
Yes	No	Comment:

Reference		Issue:
Yes	No	Comment:

Reference		Issue:
Yes	No	Comment:

Reference		Issue:
Yes	No	Comment:

Reference		Issue:
Yes	No	Comment:

Reference		Issue:
Yes	No	Comment:

15.3 APPENDIX 3: Pre – FEB meeting Check Sheet

Auckland Fire Region Pre-FEB Meeting Check Sheet

Building Name	
Address	
Architect (name and company)	
Fire Engineer (name and company)	

New Building	Alterations and Additions	Alterations	Change of Use (Sleeping)	Change of Use (Non-sleeping)

	1	2	3	4
Primary Purpose Group(s)				
Fire Hazard Category(s)				
Occupant numbers, distribution and density				
Escape height				
Floor area/ Fire cell sizes m^2				
Number of floors				

1. Scope of the Project
    a. Contractual context (check one)
        i. Conventional design and separate construction process □
        ii. Design-and-build □
        iii. Owner's design team will be transferred over to join the contractor's team to complete design. □
        iv. Project manager is appointed by the owner to exercise control over the process. □
        v. Other (if other provide clarification in space below) □

    _____
    _____
    _____
    _____

    b. Regulatory framework (check those that apply)
        i. Building Act 2004
            1. ???(new building)
            2. 112 □
            3. 115 □

ii. New Zealand Building Code
    1. C1 □
    2. C2 □
    3. C3 □
    4. C4 □
    5. F3 □
    6. F6 □
    7. F7 □
    8. F8 □

iii. Compliance documents
    1. C/AS 1 used to satisfy all or parts of C1, C2, C3, and C4 □
    2. Other compliance documents used (if checked provide information on documents) □

_____
_____

iv. Standards
    1. NZS 4512 □
    2. NZS 4541 □
    3. NZS 4515 □
    4. …….
    5. Other(if checked provide information in space below) □

    _____
    _____
    _____

v. Other
    1. HSNO □
    2. Fire Service Act 1975 □
    3. Fire Safety and Evacuation of Buildings Regulations 2006 □
    4. Firefighting Code of Practice □
    5. Firefighting Water Code of Practice □
    6. Firefighting Facilities Checklist □

c. Project schedule (check one)
    i. Fire Engineer involved early in the design process □
    ii. Fire Engineer involved midway through design process □
    iii. Fire Engineer involved late in the design process □

2. Relevant Stakeholders (check those that apply)
    a. Client □
    b. Fire engineer □
    c. Architect □
    d. Fire protection engineering systems technicians □
    e. Fire service □
    f. Council □

g. Insurance company □
h. Tenants □
i. Building operations management □
j. Other (if checked provide information in space below) □

_____
_____
_____

3. Principal Building Characteristics
    a. Occupancy
        i. Primary use groups (check those that apply)
            1. CS □
            2. CL □
            3. CO □
            4. CM □
            5. SC □
            6. SD □
            7. SA □
            8. SR □
            9. SH □
            10. WL □
            11. WM □
            12. WH □
            13. WF □
            14. IE □
            15. IA □
            16. ID □

    b. Location (Provide information if required)
        i. Proximity to relevant boundaries
            1. North _____
            2. South _____
            3. East _____
            4. West _____
        ii. Are there sleeping purpose groups in adjacent existing buildings? (Yes/No)
        iii. Is the roof height of the adjacent existing buildings greater than that of the proposed building? (Yes/No)
        iv. Fire Service access adequate? (yes/No)
        v. Site plan provided (yes/no)

    c. Size and shape (provide information)
        i. Number of floors _____
        ii. Area of each floor

            _____
        iii. General layout

            _____

_____
_____

iv. Maximum escape height _____
v. Plan and elevation drawings provided (yes/no)

d. Structure (provide details in space provided)
   i. Construction materials
   _____
   _____
   _____
   ii. Intermediate floors present (yes/no) if yes provide details
   _____
   _____
   _____
   ___
   iii. Basements present (yes/no) if yes provide details
   _____
   _____
   _____
   ___
   iv. Carparks present (yes/no) if yes provide details
   _____
   _____
   _____
   ___
   v. Shafts and ducts present (yes/no) if yes provide details
   _____
   _____
   _____
   vi. Unusual features (yes/no) if yes provide details
   vii. _____
   _____
   _____
   viii. _____
e. Management and use (check those that apply and provide details)
   i. Regular inspections of preventative and protective measures □
   _____
   _____
   _____
   ii. Training of occupants □
   _____
   _____
   _____

f. Firefighting concerns (provide details)
_____
_____
_____

g. Environmental impact of a fire (provide details)

_____
_____

h. Maintenance (provide details)
    i. Frequency and adequacy of maintenance
    _____
    _____
    _____
    ii. Regimes
    _____
    _____
    _____

i. Environmental conditions (provide details)
    i. Ventilation and prevailing internal air currents

_____

_____

_____

    ii. Prevailing patterns of wind
    _____
    _____
    _____

j. Value
    i. Capital (yes/no)
    ii. Community (yes/no)
    iii. Infrastructure (yes/no)
    iv. Heritage (yes/no)

4. Dominant Occupant Characteristics
    a. Distribution (provide information in the space provided)
        i. Total number _____
        ii. Age _____
        iii. Locations and numbers within building
        _____
        _____
        _____

    b. State (tick one)
        i. □ Awake or □ asleep
        ii. □ Intoxicated or □ sober
        iii. □ Unconscious or □ fully conscious

    c. Physical attributes (provide detail in the space provided)

i. Mobility
_____
_____
ii. Speed of travel _____
iii. Hearing ability _____
iv. Visual ability _____

d. Mental attributes (provide detail in space provided if relevant)
_____
_____

e. Level of assistance required
_____
_____

f. Level of assistance available (if assistance required)
_____
_____

g. Emergency training (yes/no) If yes provide detail.
_____
_____

h. Occupant group roles (i through iv are examples. Provide details of group roles and expected level of social cohesion in space provided.)
i. Parent or child
ii. Teacher or student
iii. Nurse or patient
iv. Staff or customer
_____
_____
_____
_____

i. Activity at the outbreak of fire (i through iii are examples. Provide details of expected occupant activities at the outbreak of fire.)
i. Asleep or awake
ii. Working in a noisy environment
iii. Focussed on an activity
_____
_____
_____
_____

j. Familiarity with the building (tick one)
i. Unfamiliar □
ii. Relatively familiar □
iii. Familiar □

5. General Objectives

a. Building regulatory objectives (Tick the objectives which are required by the Building Act 2004 for the proposed work)
    i. C1
        1. Safeguard people from injury or illness caused by fire. □

    ii. C2
        1. Safeguard people from injury or illness from a fire while escaping to a safe place. □
        2. Facilitate fire rescue operations. □

    iii. C3
        1. Safeguard people from injury or illness when evacuating a building during fire. □
        2. Provide protection to fire service personnel during firefighting operations. □
        3. Protect adjacent household units, other residential units, and other property from the effects of fire. □
        4. Safeguard the environment from adverse effects of fire. □

    iv. C4
        1. Safeguard people from injury due to loss of structural stability during fire. □
        2. Protect household units and other property from damage due to structural instability caused by fire. □

    v. F6
        1. Safeguard people from injury due to inadequate lighting being available during an emergency. □

    vi. F7
        1. Safeguard people from injury or illness due to lack of awareness of an emergency. □

    vii. F8
        1. Safeguard people from injury or illness resulting from inadequate identification of escape routes, or hazards within or about the building. □
        2. Safeguard people from loss of amenity due to inadequate direction. □
        3. Ensure that people with disabilities are able to carry out normal activities and processes within buildings. □

b. Non-regulatory objectives (Tick additional objectives)
    i. Limiting structural damage □
    ii. Limiting building contents and equipment damage □
    iii. Maintaining continuity of business operations □
    iv. Safeguarding community interests and infrastructure □
    v. Preserving heritage □
    vi. Other (if ticked please provide detail on line below) □

_____
_____

6. Hazards
    a. General layout (tick all that apply)
        i. Dead end corridors □
        ii. Unusual egress provisions □
        iii. Location of hazardous materials/processes □
        iv. Exposure to external radiant sources □
        v. Other (if ticked please provide detail on line below) □

_____
_____
_____

    b. Activities
        i. High risk activities (yes/no) If yes please clarify.

_____
_____
_____

    c. Ignition sources (tick all that apply)
        i. Smoking materials □
        ii. Electrical equipment □
        iii. Heating appliances □
        iv. Hot work □
        v. Unusual ignition sources □
        vi. Other (if ticked please provide detail on line below) □

_____
_____
_____

    d. Fuel sources
        i. Amount of combustible materials (tick appropriate boxes)
            1. FLED □ 0-500, □ 501-1000, □ 1001-1500, or □ >1500 MJ/m^2
            2. FHC □ 1, □ 2, □ 3, or □ 4
        ii. Location and orientation of combustible materials

_____
_____
_____

        iii. Fire behaviour properties (1 through 3 are examples. Please expand)
            1. Large quantities of smoke
            2. melted fuel pooling
            3. embers created
            4. fast fire growth

_____
_____
_____

        iv. Dangerous goods and explosives present (yes/no) If yes please clarify.

_____
_____
_____

7. Preventative and Protective Measures (Identify which will be addressed using C/AS1 and which will be specific fire engineering design or alternative solutions)
    a. Fire initiation and development and control (Part 2 and 9 in C/AS1)
        i. Limitation of ignition sources □ C/AS1 □ engineering design □ alternative solutions
        ii. Limitations of nature and quantity of fuel □ C/AS1 □ engineering design □ alternative solutions
        iii. Arrangement and configuration of fuel □ C/AS1 □ engineering design □ alternative solutions
        iv. Separation of ignition sources and fuel □ C/AS1 □ engineering design □ alternative solutions
        v. Management of combustibles including housekeeping measures □ C/AS1 □ engineering design □ alternative solutions
        vi. Electrical safety equipment □ C/AS1 □ engineering design □ alternative solutions
        vii. Regular plant maintenance □ C/AS1 □ engineering design □ alternative solutions
        viii. Adherence to procedures for ‘hot work’ □ C/AS1 □ engineering design □ alternative solutions

    b. Smoke Development and Spread and Control (Parts 5 and 6 in C/AS1)
        i. Smoke barriers □ C/AS1 □ engineering design □ alternative solutions
        ii. Natural smoke venting □ C/AS1 □ engineering design □ alternative solutions
        iii. Mechanical smoke management □ C/AS1 □ engineering design □ alternative solutions

    c. Fire Spread and Impact and Control (Parts 4, 5, 6, and 7 in C/AS1)
        i. Separation of fuel □ C/AS1 □ engineering design □ alternative solutions
        ii. Separation of buildings □ C/AS1 □ engineering design □ alternative solutions
        iii. Fire rated barriers □ C/AS1 □ engineering design □ alternative solutions
        iv. Fire rated structural elements □ C/AS1 □ engineering design □ alternative solutions
        v. Protected shafts □ C/AS1 □ engineering design □ alternative solutions
        vi. Fire stopping of penetrations in fire rated construction □ C/AS1 □ engineering design □ alternative solutions
        vii. Exposure protection □ C/AS1 □ engineering design □ alternative solutions

    d. Fire Detection, Warning and Suppression (Part 4 in C/AS1)

i. Automatic and manual detection equipment □ C/AS1 □ engineering design □ alternative solutions
ii. Automatic and manual warning equipment □ C/AS1 □ engineering design □ alternative solutions
iii. Surveillance equipment □ C/AS1 □ engineering design □ alternative solutions
iv. Automatic suppression equipment □ C/AS1 □ engineering design □ alternative solutions
v. Manual suppression equipment □ C/AS1 □ engineering design □ alternative solutions

e. Occupant Evacuation and Control (Parts 3 and 4 in C/AS1)
i. Evacuation plans provided (yes/no)
ii. Occupant training (yes/no)
iii. Evacuation Scheme required? (yes/no)
iv. Is an evacuation scheme required for the building? (yes/no)
v. Staged evacuation proposed (yes/no)
vi. Progressive evacuation proposed (yes/no)
vii. Detection and alarm system □ C/AS1 □ engineering design □ alternative solutions
viii. Emergency communication □ C/AS1 □ engineering design □ alternative solutions
ix. Egress signage □ C/AS1 □ engineering design □ alternative solutions
x. Emergency lighting □ C/AS1 □ engineering design □ alternative solutions
xi. Egress routes □ C/AS1 □ engineering design □ alternative solutions

f. Fire Service Intervention (Part 8 in C/AS1, CoP Firefighting Water, and optionally the CoP Firefighting)
i. Fire Service access to the site and appliance response point □ C/AS1 □ alternative solutions + Firefighting Facilities Meeting □ CoP Firefighting
ii. Building access □ C/AS1 □ CoP Firefighting
iii. Water supplies □ CoP Firefighting Water (SNZ PAS 4509:2003) □ engineering design □ alternative solutions
iv. Location of building hydrant and/or sprinkler inlets □ Firefighting Facilities Meeting □ CoP Firefighting
v. Location of building hydrant system outlets □ Firefighting Facilities Meeting □ CoP Firefighting
vi. Location of sprinkler valve +pump rooms □ Firefighting Facilities Meeting □ CoP Firefighting
vii. Location and Contents of fire control centre □ Firefighting Facilities Meeting □ CoP Firefighting
viii. Fire alarm panel location □ Firefighting Facilities Meeting □ CoP Firefighting
ix. Hose run distance from appliance to most remote location in the building □ C/AS1 □ alternative solutions + Firefighting Facilities Meeting

x. Signage indicating presence and location of hazardous materials such as materials which are highly reactive, flammable, or pose a health hazard.
□ HSNO □ Other ?

xi. Other

_____
_____
_____
__

8. Performance Requirements (not required if comparative approach is being used) (Tick those that apply.)
    a. Building regulatory specific objectives
        i. C1
            1. Fixed appliances and services shall be installed so as to avoid the accumulation of gases within the installation and in building spaces, where heat or ignition could cause uncontrolled combustion or explosion. □
            2. Fixed appliances shall be installed in a manner that does not raise the temperature of any building element by heat transfer or concentration to a level that would adversely affect its physical or mechanical properties or function. □
        ii. C2
            1. The number of open paths available to each person escaping to an exitway or a final exit shall be appropriate to: □
                a. The travel distance,
                b. The number of occupants,
                c. The fire hazard, and
                d. The fire safety systems installed in the firecell.

            2. The number of exitways or final exits available to each person shall be appropriate to: □
                a. The open path travel distance,
                b. The building height,
                c. The number of occupants,
                d. The fire hazard, and
                e. The fire safety systems installed in the building.

            3. Escape routes shall be: □
                a. Of adequate size for the number of occupants,
                b. Free of obstruction in the direction of escape,
                c. Of length appropriate to the mobility of the people using them,
                d. Resistant to the spread of fire as required by the Clause C3,
                e. Easy to find as required by Clause F8,
                f. Provided with adequate illumination as required by clause F6,
                g. Easy and safe to use as required by clause D1.3.3.

iii. C3 □

1. Interior surface finishes on walls, floors, ceilings, and suspended building elements, shall resist the spread of fire and limit the generation of toxic gases, smoke and heat, to a degree appropriate to: □
    a. The travel distance,
    b. The number of occupants,
    c. The fire hazard, and
    d. The active fire safety systems installed in the building.

2. Fire separations shall be provided within buildings to avoid the spread of fire and smoke to:
    a. Other firecells, □
    b. Spaces intended for sleeping, □
    c. Household units within the same building or adjacent buildings, and □
    d. Other property. □

3. Fire separations shall: □
    a. Where openings occur, be provided with fire resisting closures to maintain the integrity of the fire separations for an adequate time, and
    b. Where penetrations occur, maintain the fire resistance rating of the fire separations.

4. Concealed spaces and cavities within buildings shall be sealed and subdivided where necessary to inhibit the unseen spread of fire and smoke. □

5. External walls and roofs shall have resistance to the spread of fire, appropriate to the fire load within the building and to the proximity of other household units, other residential units, and other property. □

6. Automatic fire suppression systems shall be installed where people would otherwise be:
    a. Unlikely to reach a safe place in adequate time because of the number of storeys in the building, □
    b. Required to remain within the building without proceeding directly to a final exit, or where the evacuation time is excessive, □
    c. Unlikely to reach a safe place due to confinement under institutional care because of mental or physical disability, illness or legal detention, and the evacuation time is excessive, or □
    d. At high risk due to the fire load and fire hazard within the building. □

7. Air conditioning and mechanical ventilation systems shall be constructed to avoid circulation of smoke and fire between firecells.

8. Where an automatic smoke control system is installed, it shall be constructed to:
    a. Avoid the spread of fire and smoke between firecells, and
    b. Protect escape routes from smoke until the occupants have reached a safe place.

9. The fire safety systems installed shall facilitate the specific needs of fire service personnel to:
    a. Carry out rescue operations, and
    b. Control the spread of fire.

10. Environmental protection systems shall ensure a low probability of hazardous substances being released to:
    a. Soils, vegetation, or natural waters,
    b. The atmosphere, and
    c. Sewers or public drains.

iv. C4

1. Structural elements of buildings shall have fire resistance appropriate to the function of the elements, the fire load, the fire intensity, the fire hazard, the height of the buildings, and the fire control facilities external to and within them.
2. Structural elements shall have a fire resistance of no less than that of any element to which they provide support within the firecell.
3. Collapse of elements having lesser fire resistance shall not cause the consequential collapse of elements required to have a higher fire resistance.

v. F6

1. An illuminance of 1 lux minimum shall be maintained at floor level throughout buildings for a period equal to 1.5 times the evacuation time or 30 minutes, whichever is the greater.
2. Signs to indicate escape routes shall be provided as required by clause F8.

vi. F7

1. A means of warning must alert people to the emergency in adequate time for them to reach a safe place.
2. Appropriate means of detection and warning for fire must be provided within each household unit.
3. Appropriate means of warning for fire and other emergencies must be provided in buildings as necessary to satisfy the other performance requirements of this code.

vii. F8
    1. Signs shall be clearly visible and readily understandable under all conditions of foreseeable use. □
    2. Signs indicating potential hazards shall be provided in sufficient locations to notify people before they encounter the hazard. □
    3. Signs to facilitate escape shall: □
        a. Be provided in sufficient locations to identify escape routes and guide people to a safe place, and
        b. Remain visible in the event of a power failure of the main lighting supply, for the same duration as required by Clause F6.
    4. Signs shall be provided in sufficient locations to identify accessible routes and facilities provided for people with disabilities. □

b. Non-regulatory specific objectives (Tick any that apply and provide specific objectives in space provided.)
    i. Limiting structural damage □
    _____
    _____
    _____
    ii. Limiting building contents and equipment damage □
    _____
    _____
    _____
    iii. Maintaining continuity of business operations □
    _____
    _____
    _____
    iv. Safeguarding community interests and infrastructure □
    _____
    _____
    _____
    v. Other □
    _____
    _____
    _____

9. Acceptance Criteria For the Analysis (Refer back to section13 for the performance requirements these acceptance criteria are required to meet <u>if</u> an <u>absolute approach</u> is used. Complete (a) if a comparative approach is being taken or (b) if an absolute approach will be used.)
    a. Comparative approach (provide detail on how the performance of the alternative solution will be numerically compared with that of the acceptable solution)

_____
_____
_____
_____

b. Absolute approach (provide numerical values which will be used to determine performance)

_____

_____

_____

_____

15.4 APPENDIX 4: Firefighting Facilities Checklist

Fire Fighting Facilities Checklist

This check sheet is not mandatory but should be completed and included with other documentation that is required as part of the Building Consent Process.

The applicant is to complete Part A and B.

Part C is to be completed in consultation with a New Zealand Fire Service representative that will be appointed by the Fire Region in which the building will be located. Please refer to the telephone directory white pages for contact details under FIRE SERVICE.

Part A - Administration (to be completed by applicant)

1. Address of Property			
Street Number		Lot Number	
Street Name			
Town/Suburb		City/Region	
Premises / Company Name			or N/A

2. Applicants Details			
Applicants Name			
Street Number		Street Name	
Town/Suburb		City/Region	
Phone Number		Fax Number	
Mobile Number		E-mail Address	

3. Project Details	
Tick the appropriate box:	
New building	☐
Addition/Alterations	☐
Change of use	☐

Part B – Building Use (to be completed by applicant)

1. Building Description		
Number of floors above lowest final exit		
Number of basement floors		
Floor area (largest floor)		m^2

2. Predominant Building Use	
Tick the appropriate box:	
Residential, Apartment, Terrace	☐
Transient Sleeping – Hotel, Motel, Boarding House, Hostels	☐
Community Care – Rest Home, Hospital	☐
Community – Public, Church, School, Recreation	☐
Merchandising – Shop, Shopping Centre, Exhibitions	☐
Industrial – Factory, Office	☐
Other (please specify)	_____

3. Does Building require a Liquor License?
Yes ☐ No ☐

4. Owners Details (if different from Applicant)			
Owners Name			
Street Number		**Street Name**	
Town/Suburb		**City/Region**	
Phone Number		**Fax Number**	

5 (a). All Buildings	
Tick the appropriate box:	
Are hazardous substances stored?	Yes ☐ No ☐
Are early childhood facilities provided?	Yes ☐ No ☐
Is specialised care for people with a disability provided?	Yes ☐ No ☐
Is specialised nursing, medical or geriatric care provided?	Yes ☐ No ☐
Are people in lawful detention?	Yes ☐ No ☐

Does the building have a sprinkler system compliant with NZS 4541 or NZS 4515?
If yes, go to 5(c). If not, go to Part 5(b).

5 (b). Unsprinklered Buildings	
Tick the appropriate box:	
Are there facilities for more than 10 employees?	Yes ☐ No ☐
Do 100 or more people gather?	Yes ☐ No ☐
Is accommodation provided for more than 5 people?	Yes ☐ No ☐

5 (c). Sprinklered Buildings	
Tick the appropriate box:	
Do 100 or more people gather in a common venue?	Yes ☐ No ☐

If you have replied yes to any of the questions in Section 5 the building will require a scheme

Part C – Fire Fighting Requirements Checklist (to be completed in conjunction with the local District Chief Fire Officer prior to submitting documentation for building consent)

1. Firefighting Water **Refer Fire Fighting Water Supplies Code of Practice NZS PAS 4509:2003 Available on NZFS Website (http://www.fire.org.nz/building/water.htm)**	**Fire Service use only**
1.1 Building water supply classification: Fire Hazard Category (FHC) ☐ Largest Floor Area/Firecell ☐ m^2 Required water supply classfication W ☐	
1.2 Available water supply classification W ☐ (Table 2 NZS 4509)	
1.3 Available firefighting water supply information provided Flow rate within 135 m ☐ l/s No. of hydrants ☐ Flow rate within 270 m ☐ l/s No. of hydrants ☐	Yes ☐ No ☐
1.4 Hydrant locations in relation to building (drawing provided)	Yes ☐ No ☐
Check: Is classification 1.1 less than or equal to classification from 1.2? If no, water in public main is insufficient to extinguish fire, require mitigation policy.	Yes ☐ No ☐

2. New Zealand Fire Service access to site		**Fire Service use only**
2.1	Gate key required	Yes ☐ No ☐
2.2	Access width adequate	Yes ☐ No ☐
2.3	Hardstanding to within 18 m of main entrance or	Yes ☐ No ☐
2.4	Hardstanding to within 18 m of sprinkler inlet or	Yes ☐ No ☐ N/A ☐
2.5	Hardstanding to within 18 m of building hydrant system inlet	Yes ☐ No ☐ N/A ☐
2.6	Hardstanding for aerial appliances provided	Yes ☐ No ☐ N/A ☐

3. New Zealand Fire Service access to building		**Fire Service use only**
3.1	Building access points for Fire Service identified	Yes ☐ No ☐
3.2	Doors open on activation of fire alarm	Yes ☐ No ☐
3.3	Door keys required	Yes ☐ No ☐
3.4	Lift control provided Key Type: Lobby control ☐ Car control ☐ Lift motor room ☐	Yes ☐ No ☐ N/A ☐

4. Waterway		Fire Service use only
4.1	Brigade inlet location(s) suitable: Hydrant Sprinkler	 Yes ☐ No ☐ N/A ☐ Yes ☐ No ☐ N/A ☐
4.2	Fire hydrant outlet locations suitable and safe All points within reach of 50 m arc Min. Pressure (≥ 600 kpa) ☐ Type of key securing outlet ☐	Yes ☐ No ☐ N/A ☐ Yes ☐ No ☐ N/A ☐
4.3	Sprinkler house (pump/valve set) location suitable Type of door key ☐ Type of key securing valves ☐	Yes ☐ No ☐ N/A ☐
4.4	Sprinkler floor isolation valves location suitable Floor isolation valves location clearly indicated	Yes ☐ No ☐ N/A ☐ Yes ☐ No ☐ N/A ☐

5. Fire Alarm Panel		Fire Service use only
5.1	Main panel required	Yes ☐ No ☐
5.2	Fire alarm panel location suitable Indicating light required Colour ☐	Yes ☐ No ☐ N/A ☐ Yes ☐ No ☐ N/A ☐
5.3	Mimic panel(s) required	Yes ☐ No ☐ N/A ☐
5.4	Sector panel(s) required	Yes ☐ No ☐ N/A ☐
5.5	ATS connection required	Yes ☐ No ☐ N/A ☐
5.6	Fire alarm brigade connection required by ☐ / /	

6. Fire Systems Centre		Fire Service use only
6.1	Emergency Warning Information System (EWIS) provided EWIS panel located within Fire Systems Centre	Yes ☐ No ☐ Yes ☐ No ☐ N/A ☐
6.2	Fire Systems Centre location suitable	Yes ☐ No ☐ N/A ☐
6.3	Fire Fan Control Panel instructional schematic provided	Yes ☐ No ☐ N/A ☐

7. First Aid Firefighting		Fire Service use only
7.1	Fire hose reels provided in accordance with NZS 4503	Yes ☐ No ☐ N/A ☐
7.2	Fire extinguishers provided in accordance with NZS 4503	Yes ☐ No ☐ N/A ☐

New Zealand Fire Service Sign Off (ensure all relevant drawings are date stamped)

The above features are acceptable to the Chief Fire Officer

Name (print)		**Rank**	
Signature		**Date**	
District			
Region			

Drawing Information

Drawing Number	Version	Date	Drawn By

15.5 APPENDIX 5: Fire Industry Questionnaire

College of Engineering

UNIVERSITY OF CANTERBURY
Te Whare Wānanga o Waitaha
CHRISTCHURCH NEW ZEALAND

5th July 2007

Dear Sir/Madam,

RE: Short questionnaire on the involvement of NZFS in the Building Act 2004

I am currently finalising my Masters degree in Fire Engineering at the University of Canterbury. As such, I am writing to you to seek your assistance and feedback.

My project is looking at the involvement of the Fire Service in the Building Act 2004, with specific attention on the Design Review Unit. As this has been in operation for some time now, I am interested to get feedback and comments on the process to date from your point of view, in your professional capacity.

I enclose a series of short questions and would appreciate it very much if you could take a little time to provide your comments. It should take no more that ten to fifteen minutes to complete. Please feel free to circulate to your work colleagues also.

Please note, this questionnaire is not linked to, or directed by the Fire Service or the DRU. Although I have support to undertake this process, it forms part of my personal project arrangements. All comments received will be treated in strict confidence and no personal details will be published nor released. Should you have any concerns or comments about this questionnaire, please contact Mike Spearpoint at the University of Canterbury at michael.spearpoint@canterbury.ac.nz

The completed questionnaire can be returned to me at alan.merry@fire.org.nz. Alternatively, it may be faxed to me at (03) 3713639, or posted to PO Box 13-747, Christchurch. I would appreciate receiving your comments by Tuesday 31st July.

Thank you very much for your assistance.

Yours sincerely

Alan Merry
Fire Engineer

Notes for recipients

- Please place a “tick” in the boxes provided
- Answers may be hand-written or typed. Please take care if providing hand-written responses so as your comments can be accurately reflected when reviewing responses
- Please use additional paper should you wish to extend your comments beyond the space provided

2.) Are you a

- Fire Consultant
- Approval authority
- Other – please specify

_____

3.) What region are you based in?

_____

4.) What design methodology does your organisation/firm use?

- International Fire Engineering Guidelines (IFEG)
- SFPE Guide to Performance-Based Fire Protection
- Construction Industry Council Guidelines (CIC)
- Other(s), please specify

_____

5.) In your view, what percentage of performance versus prescriptive design has your organisation/firm been involved in?

- Pre-Building Act 2004

  Performance–based _____% Prescriptive _____%

- Post Building Act 2004

  Performance–based _____% Prescriptive _____%

If there has been a change, could you please indicate why?

_____

6.) What work does your client brief you to undertake? Please tick as many as you feel are relevant.

- To achieve approval of building consent
- To provide input to other designers
- To demonstrate compliance with the Building Act

- Other, please specify

_____

7.) Is your organisation/firm involved in post consent site inspection and construction monitoring activities?

- Yes

What percentage of your overall work would this constitute?

- 0 – 10%
- 10 – 20%
- 20 – 30%
- 30 – 40%
- >40%, please specify

_____

- No, please give some reasons why

_____
_____
_____
_____
_____
_____

8.) Should the NZFS be involved in a building design prior to consent?

- Yes

What should this involvement be?

- Only firefighting issues
- Design criteria
- Design methodology
- Other, please specify

_____
_____
_____
_____
_____
_____

□ No, please specify

_____

_____

_____

_____

_____

_____

9.) In your opinion, what value does the NZFS provide to the building consent process? Please tick one.

□ None □ Not very much □ Some □ A lot □ Substantial

10.) Do you find the memoranda issued by the NZFS are clear?

□ Yes, please specify
□ No, please specify

_____

_____

_____

_____

11.) Do you find the memoranda issued by the DRU are useful?

□ Yes, please specify
□ No, please specify

_____

_____

_____

_____

12.) Do you find the memoranda issued by the DRU are informative?

□ Yes, please specify
□ No, please specify

_____

_____

_____

_____

13.) Do you find the fire-fighting facilities checklist developed by the NZFS useful to your work?

- Yes, please specify
- No, please specify

_____

_____

_____

_____

14.) Do you find engaging in a Fire Engineering Brief (FEB) process with the NZFS useful and beneficial to your work?

- Yes, please specify
- No, please specify

_____

_____

_____

_____

15.) Any other comments you would like to add? (Please feel fee to add additional paper)

_____

_____

_____

_____

_____