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Fire and Emergency New Zealand

Operations and Performance Review: Phase Two

March 2018

Private & Confidential

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2 March 2018

Operations and performance review - Phase Two

Dear Brett and Brian

Please find attached our final report regarding Phase Two of the operations and performance review for Fire and Emergency New Zealand (FENZ). This version of the report incorporates all feedback received to date from FENZ and the Department of Internal Affairs.

As requested, this report covers all elements of the terms of reference included in the Client Services Order (CSO) signed on 24 August 2017. The CSO also outlines the terms and conditions and liability limitations relating to our work. Please note that this document should be read in conjunction with the Important Notice in Appendix C.

We would like to thank you and your teams for their cooperation throughout this project. We look forward to any future opportunities to work with you in the future including, in particular, the continued development and realisation of benefits within FENZ.

Yours sincerely

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Director

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Executive summary

Context and purpose

As part of the establishment of Fire and Emergency New Zealand (FENZ), Cabinet agreed that a comprehensive operational and performance review (the review) of the New Zealand Fire Service Commission (NZFS or the Commission) be undertaken to inform key funding and performance-setting decisions.

There are two phases to the review. The first phase, completed in 2017, assessed the efficiency and effectiveness of the NZFS. The second phase (this report) focuses on the Commission's approach to planning and budgeting and on identifying the benefits that stem from the Commission's activities[1].

Overall, the two phases of the review are aimed at improving organisational efficiency and effectiveness and ensuring that value for money is delivered. Phase Two of the review is directed toward:

- identifying opportunities to improve planning and budgeting
- enabling the Commission to tell its value for money story by articulating the benefits and value that stem from the roles it performs.

Scope

The terms of reference (ToR) for Phase Two has three main elements:

- Budgeting – test the accuracy and robustness of methodologies underpinning the Commission's 2016/17 budgets, assess variances between budgets and actual results and identify opportunities for improvement
- Planning – test strategic and operational and planning processes against best practices and identify opportunities for improvement
- Benefits – review the nine categories used by the Commission for grouping its activities, identify the benefits that each activity delivers and, to the extent possible, quantify those benefits (or develop an approach to their quantification where this is not readily achievable).

Key findings and next steps

Planning

There are four aspects of the Commission's approach to planning and budgeting that do not align well with good practices; strategy, culture, process and capability.

- Strategy – the organisation lacks an overarching strategy to direct and inform planning and budgeting towards achievement of strategic priorities and desired outcomes. Although the 2017/18 Statement of Performance Expectations and Statement of Intent articulate strategic priorities and outcomes, these are pitched at a high level which does not assist in any meaningful way with the prioritisation and allocation of resources.
- Culture – a combination of contributing factors mean the organisation's culture does not support effective planning as well as it should, including a lack of accountability for delivering on plans and budgets and a history of operating in silos.
- Process –the organisation's planning process does not adhere to the planning timeline, shown in Figure 2 on page 11, which allows for planning to inform budgets and includes a definitive point at which strategic plans are confirmed.
- Capability – the organisation's capacity to support an effective planning cycle is limited as the corporate centre is lean and there are issues with some supporting tools.

[1] FENZ was established on 1 July 2017. In general, this report refers to the Commission/NZFS rather than FENZ given that the focus has been on FY17 which pre-dates FENZ.

Improvement opportunities

FENZ is currently focused on improving its planning and budgeting processes. The changes underway or planned will address the need for an organisational strategy, bring a more strategic focus to planning and budgeting and strengthen accountability for business unit level plans and budgets. The changes will require investment in training and tools to support effective planning.

Budgeting – Levy Forecasting

The approach to forecasting monthly and annual levy revenues is sound. The accuracy of these forecasts has been relatively satisfactory. Although forecasting accuracy has been helped by a change in legislation that requires detailed information relating to levy payments greater than $1,000, there are several factors contributing to variances which remain difficult for FENZ to mitigate. These include the majority of payments that are less than $1,000 (which means no detail is available) as well as one off contract works payments.

NZFS's approach to forecasting the levy base has been relatively simple but, nevertheless, adequate. GDP growth is a core component of the approach to forecasting the levy base as it influences insurance premiums which underpin non-residential, residential and motor vehicle levy revenue. The approach also takes into account growth in the housing stock and the vehicle fleet.

Improvement opportunities

We have not identified any specific opportunities to improve the accuracy of levy related forecasts, over and above the continuous improvement processes already in place. GDP growth assumptions could be modified to more closely align with recent, and unusually high, GDP growth rates. We note, however, the assumption used by NZFS is commonplace across many government organisations. It should be noted that changes may be made to levy design in 2019. If so, it would make sense to await more detail regarding the nature of those changes before revisiting the need for further improvements.

Budgeting - Expenditure

In FY17, actual expenditure exceeded budget by slightly over 1%.

The models and assumptions supporting the budgeting process are sound and reflect, reasonably well, the reality of the organisation. We note that the fixed cost nature of the business (including the cost of maintaining readiness) means that core business as usual in a financial sense does not change much from one year to the next, other than for the effects of cost inflation.

Improvement opportunities

FENZ may need to review some of the assumptions relied upon, particularly with respect to the personnel establishment and incorporating any impact associated with the assets inherited from Rural Fire Authorities.

We note that budgeting (and planning) processes could be better supported by investing in asset management tools.

Variance Analysis

Overall, the amount of net over-expenditure (operating and capital) is relatively small and needs to be seen in the context of levy revenues being well in excess of budget ($392.3 million actual in FY17 compared to budget of $368.3 million). In summary, most of the over-expenditure is driven by major natural events and much of the under-expenditure reflects initiatives not proceeding to plan. Natural events are, by definition, unpredictable. Accordingly, when such events occur, they give rise to an unfavourable expenditure variance. The underlying issue with regard to under-expenditure is whether management of initiatives could be tighter, requiring the organisation to be more agile in responding to delays in one area by ramping up activity in another area.

Like any organisation, steps should continue to be taken to better anticipate changes in expenditure but we conclude that there is nothing arising from the variances that point to a need for major changes to the way in which expenditure is forecast.

Benefits

The nine categories used by NZFS to group its activities are appropriate. This is because they are comprehensive, reflect the organisation's mandate, are distinct from one another and are material in their own right.

To date, FENZ has not focused in detail on identifying and measuring the benefits stemming from its activities. As a result, measuring and quantifying benefits within this review has proven difficult. Accordingly, our focus has gone on developing approaches to measuring and quantifying the benefits identified and prioritised during the course of the review.

Figure 1 on the next page illustrates in summary terms how the core and supporting benefits relate to FENZ's outcomes, impacts and activity categories. It shows the main, rather than all, relationships (recognising that in many cases there are many-to-many relationships involved). It should be noted that the strength of the linkages varies and, in a small number of cases, the nature of the linkage may not necessarily be well defined (eg the link between USAR and swiftness of recovery from a major disaster).

Benefits – identification, rationalisation and prioritisation

Good practice suggests that focusing on a core set of benefits is key to effective benefits realisation and management. As such, after a workshop with key stakeholders, we rationalised and prioritised a long list of benefits to arrive at the following core benefits. These are seen as being central to the outcomes and impacts FENZ wishes to deliver:

- **Prevention of harm**
- **Reducing potential economic loss**
- **Reducing damage to the environment**
- **Option value** (ie the value placed on having access to fire and emergency services regardless of whether or not they are used)
- **Social capital** (ie the benefit which comes from FENZ being a part of, and contributor to, communities and community cohesion).

Benefits – measurement approaches

Because of data and other limitations, we have not been able to quantify reliably the benefits FENZ delivers to New Zealanders. Part of this is the difficulty in defining the counterfactual; that is, how to measure the benefit FENZ delivers, compared to the situation had FENZ not been involved.

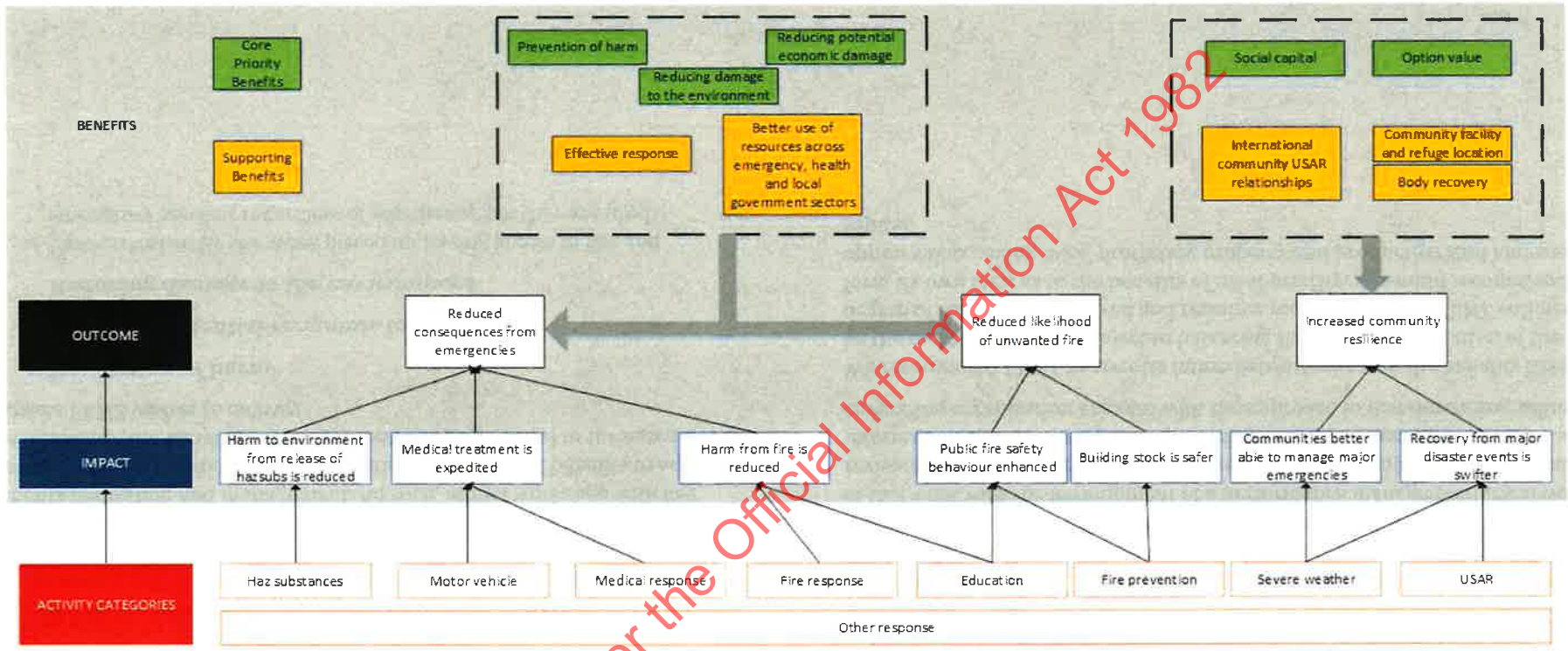
Accordingly, we have sought to identify possible approaches to measuring benefits that FENZ can look to adopt. Additionally, where data exists (internally at FENZ or as part of external research) we have identified this. The approach to measuring FENZ's core benefits is summarised in Section 7.

Benefits - Next steps

FENZ needs to take several steps in order to make progress with implementing the approaches suggested for benefits measurement. These include integration of this work with the development of a performance management framework, a review of the business processes and systems that are important to generating information needed for benefits quantification and assigning benefits owners to ensure the organisation engages with the approach to demonstrating value.

We recommend FENZ focuses its immediate attention on the benefits likely to be the most significant (subject to balancing this with consideration of the degree of complexity involved and resource required). While FENZ will need to form its own view as to the benefits of most priority, we would recommend option value, saving lives, protecting property and productive land and social capital.

Figure 1: Key relationships between benefits, outcomes, impacts and activity categories



1. Introduction

Context and purpose

As part of the establishment of Fire and Emergency New Zealand (FENZ), Cabinet agreed that a comprehensive operational and performance review (the review) of the New Zealand Fire Service Commission (NZFS or the Commission) be undertaken to inform key funding and performance-setting decisions.

There are two phases to the review. The first phase, completed in 2017, assessed the efficiency and effectiveness of the NZFS. The second phase (this report) focuses on the Commission's approach to planning and budgeting and on identifying the benefits that stem from the Commission's activities.

Overall, the two phases of the review are aimed at improving organisational efficiency and effectiveness and ensuring that value for money is delivered. Phase Two of the review is directed toward:

- identifying opportunities to improve planning and budgeting
- enabling the Commission to tell its value for money story by articulating the benefits and value that stem from the roles it performs.

Terms of reference

The terms of reference for Phase Two of the Operations and Performance Review (the review) has three main elements:

- Planning:
  - Test the Commission's 2016/17 strategic and operational planning processes (for example, those driving the 2016/17 Statement of Performance Expectations) against best practice for a broadly equivalent large organisation. As part of the testing, focus should be given (but not limited) to the following areas:
  - alignment and integration of planning processes with budgeting processes;
  - the validity and accuracy of assumptions used;
  - the nature and extent of the involvement of internal and external stakeholders;
  - integration of 2015/16 actual performance (and lessons arising) into the process; and
  - the nature and extent of reporting against plans.
  - Recommend improvements to provide effective integrated planning and reporting, and the practical delivery of resulting plans.
- Budgeting:
  - Test the accuracy and robustness of the methodologies (including the models and assumptions) used to develop the Commission's 2016/17 budgets (both business as usual and the transition project), particularly those used to determine forecast revenue. Make recommendations for improvements to the budgeting methodologies, models and assumptions.
  - Compare the 2016/17 budgets with the actual 2016/17 financial results and identify areas of significant difference, and the causes for that difference. Make recommendations for forecasting improvements.
- Benefits framework:
  - Review the nine categories used by the Commission for grouping its activities (as found in the Commission's Activity-Based Costing Model): fire response; hazardous substances; motor vehicle; medical response; natural disaster; urban search and rescue; other response and rescue; education; and, fire prevention. Confirm if these are the most appropriate categories to use, and recommend any alterations as required.
  - Identify the benefits that each category (or suggested alternative category) can be expected to deliver to New Zealanders.
  - Identify the information required to quantify the benefits identified for each category. Where the information is:

- already being collected, determine the quantum of the benefit for that category; or
- not being collected, identify appropriate data sources or collection methods.

Important caveats

Planning and budgeting

The terms of reference have required the review to focus on planning and budgeting in the context of the 2016/17 financial year. This was the last year of operation for the former NZFS prior to the establishment of FENZ with effect from 1 July 2017.

The comments and observations in this report reflect the situation as it existed in 2016/17. There are many changes underway in relation to planning and, to a lesser extent, budgeting, the effect of which is to render some of the observations in this report somewhat historical. In particular, the following should be noted.

- There has been a lot of work on developing an organisation-wide strategy. In 2016/17, NZFS did not have a documented strategy.
- The outcomes framework for NZFS did not include any strategic priorities although the Statement of Performance Expectations (SPE) did include several inward-facing organisational priorities. Strategic priorities have been included in FENZ's 2017/18 SPE and, moreover, the outcomes framework has been significantly modified compared to that which existed in 2016/17.
- The process for 2018/19 planning and budgeting is being comprehensively reviewed with a view to developing and implementing an integrated planning, reporting and budget cycle (together with updated business planning guidance and templates). Furthermore, the size of the Strategy and Performance team, which facilitates the strategic and business planning process, has in relative terms, been increased significantly (three new positions making a total of nine positions)[2].
- FENZ includes the rural fire service previously delivered by 38 Rural Fire Authorities (RFAs). There is a lot of work underway to better understand the state of the rural fire service and the level of investment that is needed to integrate that service with the urban fire service (previously provided by the NZFS).

More generally, during 2016/17, considerable organisational focus was placed on the establishment of FENZ and ensuring that on "Day 1" the transition was smooth with no interruption to normal fire (and emergency service provision). Reflecting this, 2016/17 would not generally be considered to be a normal year.

The findings in this report need to be seen in context of the points above. That said, however, the issues identified in relation to planning and budgeting continue to have relevance inasmuch as they are aspects of planning and budgeting which need to be addressed in order to enable FENZ to be a fully effective organisation.

Part of the terms of terms of reference requires us to comment on the nature and extent of reporting against plans. PwC has recently completed a separate review of financial and management reporting and it covers this issue in some detail. Accordingly, we have not devoted a lot of focus in this report to this aspect of the review. Reference is made to the earlier review where useful to do so.

Benefits

We note that the scope of benefits does not include the benefits relating to the transition to FENZ. As confirmed with FENZ and the Department of Internal Affairs (DIA), this is not within scope of this review; rather, the focus is on the benefits which stem from the roles performed by FENZ.

[2] Strategy and Performance Business Plan FY2017/18 to FY 2020/21 page 2.

Report structure

Beyond this introductory section, the report is structured into the following parts and sections.

Planning

- Section 2 starts with planning for the reasons that plans should drive and inform budgets (rather than the other way around). Our comments on planning help to put the analysis of budgets into context. Current approaches to planning are assessed and opportunities for improvement identified.

Budgeting

- Section 3 focuses on the approach to forecasting levy revenues.
- Section 4 addresses the approach to, and assumptions underpinning, expenditure forecasts.
- Section 5 recaps on the reasons behind variances between budgets and actual outturns and assesses whether more could be done to anticipate and reduce variances.

Benefits

- Section 6 recaps on the nine main activity categories which describe what FENZ does and assesses their usefulness as a basis for framing the benefits that FENZ delivers.
- Section 7 takes the prioritised benefits and outlines proposed measurement approaches. Previous work relating to benefits measurement and/or data sources are noted.
- Section 8 comments on how FENZ can take the benefits related findings forward.

Appendices

- Appendix A outlines the approach taken to coping the range of benefits. This includes a description of the process used to identify and rationalise the benefits stemming from FENZ. It highlights the priority of each of those benefits and identifies those taken forward for measurement.
- Appendix B lists the research and other documents cited in this report.
- Appendix C sets out restrictions that should be noted when reading this report.

Approach

Our work has involved interviews with FENZ's senior leadership team, operational leadership team and other relevant FENZ personnel. It has also involved a workshop with relevant stakeholders in the early stages of the benefits component of this engagement.

Our work has regard to good planning and budgeting principles and practices, as adopted across the public and private sectors, and internationally published research and knowledge regarding benefits measurement.

Planning

2. Planning

Introduction

In Phase One of the Operations and Performance Review, we observed that NZFS is very operationally focused and reactive. To be fully effective, however, the organisation needed to be more strategic. We noted that:

- there is no strategic plan to give effect to Vision 2020
- there are strategic plans in some areas (eg property) but gaps in other areas (eg Information, Communications and Technology) and, overall, strategies are not well integrated across the organisation
- the scope of roles of the organisation have broadened but these are not being guided by an overarching strategy and plan.

The issues we identified in Phase One have surfaced again in the context of the focus on planning (and budgeting) as part of Phase Two of the review. Overall, we find that planning within the former NZFS is not as effective as it could, or should, be.

The terms of reference for the review require us to test the Commission's 2016/17 strategic and operational planning processes. Figure 2 on page 11 illustrates the planning timeline for NZFS. Although this is the timeline in use during FY17, we understand this was the template that was being used for developing budgets and plans for 2016/17.

Although there are issues with planning processes, the issues are wider than just process related. In short, and as discussed further below, there are issues with planning in respect of strategy, culture, process and capability.

Current state assessment

Strategy

Almost by definition, it is difficult to develop effective plans if there is no overarching sense of strategic direction and/or organisational strategy. As discussed in more detail in the Phase One report (and not repeated here), the former NZFS was not particularly strategic.

Reflecting this, there is no overarching organisational strategy or business plan which is a significant shortcoming given the size and importance of NZFS (now FENZ)[3]. Moreover, we have not found evidence of there being a robust allocation framework to inform planning and budgeting.

Plans and budgets for 2016/17 were prepared without a clear view of strategy or strategic priorities. At that time, the Statement of Intent (SoI) was becoming out of date; the last SoI having been prepared for the period 2014-2018. The "strategic" priorities within that SoI were framed around key activity areas rather than outcomes or impacts. The SPE for 2016/17 contained some strategic priorities but these were all inwardly focused on the organisation (and not on the achievement of outcomes or impacts).

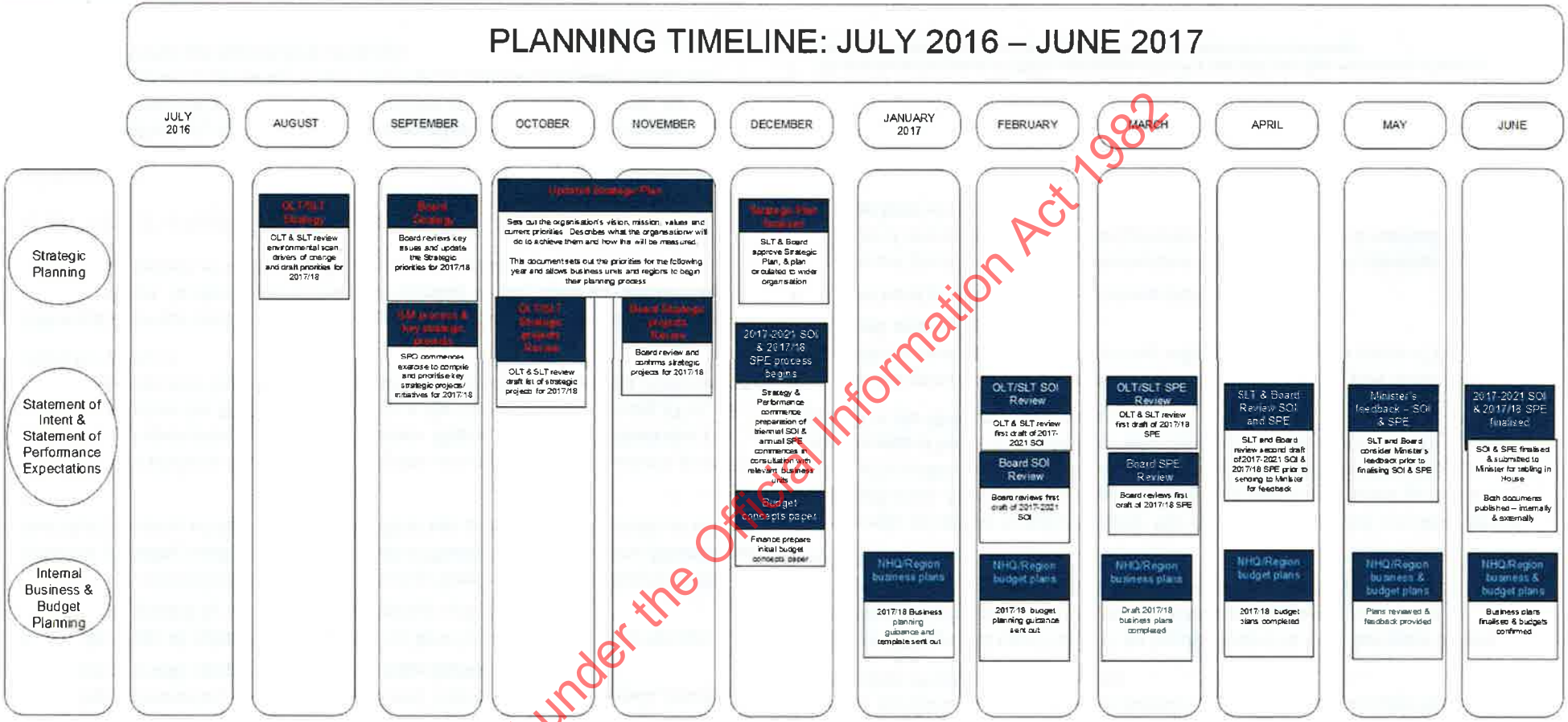
The latest SPE and SoI (2017/18) are an improvement on what has gone before inasmuch as they have a much clearer outcomes and impacts framework supported by a strategy map which includes strategic priorities linked to outcomes and impacts.

The strategic priorities contained within the 2017/18 SPE and SoI are described at a very high level. Although this is not unusual, it is common practice to cascade high level priorities to lower levels that provide more specificity regarding the priority areas of focus. The problems with the very high level priorities that are included in the SPE and SoI are that they:

- do not provide much of a steer for planning in the sense that almost any activity could be described in a way which links to one or more of the high level strategic priorities
- are hard to relate to at the business unit level
- do not provide an effective mechanism for allocating and prioritising the use of resources; an allocation/prioritisation framework is needed below the level of strategic priority.

3 We note that in the lead up to FENZ's establishment, the view was taken that there was not a lot of point in developing strategy for an organisation (ie NZFS) that was about to go out of existence.

Figure 2: NZFS Planning Timeline



Based on the timeline shown in Figure 2, strategic planning is supposed to take place in October at the front end of the planning and budgeting cycle with prioritisation (at a strategic level) occurring in November. In practice, we do not see much evidence of this occurring.

We note that strategic planning can be viewed as a more dynamic and ongoing process than the diagram implies. Nevertheless, the strategic thinking needs to come together at a well-defined point in the overall planning and budgeting process.

Leaving that to one side, however, the key point is that plans and budgets are not being informed by organisation-wide strategic plans. There does not appear to be much evidence that strategic planning is a well developed part of overall planning and budget setting.

Culture

There are several features of the former NZFS which create an organisational culture that works against effective planning. There are three main aspects to this.

The first of these is a tendency to concentrate on the short term. The organisation is strongly and commendably motivated by service to the community. This translates into an organisation that is highly responsive to community needs but, as a consequence, the organisation is highly reactive to the "here and now". Looking ahead and planning is not naturally complementary to this mind-set.

The second aspect of culture is accountability. Phase One of the Operations and Performance review found that NZFS is an organisation that struggles to hold people to account and this aspect of corporate culture serves to reduce the incentives for, and focus on, effective planning. There are several contributory factors.

- A recent review of financial and management reporting found that existing reports do not effectively foster accountability (or support decision making). It follows that if there is weak accountability within the organisation for delivering against plans, the incentives to focus on planning are dulled.
- NZFS operates with low levels of financial delegation and managers typically have very small amounts within their overall budget which are discretionary. Furthermore, budgets are largely centrally determined. In this environment, some managers take the view that if they have little discretion over financial resources and have little involvement in budget setting, there is not much point in taking ownership of, and responsibility for, planning.

Having low levels of financial delegation and a highly centralised approach to budgeting is not necessarily inappropriate, particularly in light of the very high proportion of NZFS cost that is fixed. The underlying problem which the observations above point to is a lack of effective accountability in terms of what managers are expected to deliver (in an activity/output sense) or achieve (in terms of impacts and contribution to outcomes).

Lastly, the culture of NZFS has tended to be one of operating as a set of siloes. This aspect of culture conflicts with the need for integrated plans.

Process

There are several features of the planning and budgeting process which work against effective planning.

Budgets lead plans rather than the other way around

Notwithstanding the planning and reporting timeline shown in Figure 2, the reality is that there is little, or no, alignment between the regional business planning process and budget setting process for the regions. Regional budgets are, to all intents and purposes, determined in January/February (consistent with Government budget cycle) but planning and budget guidance is sent out during this period and draft plans are not completed until March. In the year ending June 2017, expenditure in the regions accounted for slightly over half of NZFS's total expenditure.

Several aspects of the approach to budgeting contribute to the situation where budgets drive plans rather than the other way around.

- There are many financial models which are used to forecast expenditure across most inputs including people, property, fleet and information,

communication and technology (ICT). Beyond these inputs, there is not much else to forecast. A lot of the parameters feeding into budget models are centrally determined. Regions have minimal influence over the models and, hence, budget setting[4].

- NZFS is overwhelmingly a fixed cost business. Reflecting this, the budgeting process is heavily top-down which means there isn't much scope for bottom-up planning to inform overall plans and budgets.
- The view has also been expressed to us that historically business plans have over-estimated the quantum of work that can be achieved which has resulted in under-delivery relative to plan. This has spurred centralised management of the budgets to maximise opportunities for reallocating resources when projects run behind schedule.

While the factors above help to explain why budgets lead plans, a consequence is that it diminishes the focus given to planning and lessens the sense of ownership that business unit managers have for budgets (and plans).

There is not strong accountability for budgets and plans

The factors that contribute to budgets driving planning also point to more fundamental issues regarding accountability. The dominant role played by Finance in determining budgets risks creating an unintended impact in the sense of diminishing, rather than strengthening, the degree to which business unit managers feel accountable for the plans and budgets in their area. This is reinforced by the fact that fire region managers and corporate senior management team members are not required to provide sign off as part of the budget approval process[5]. That is not consistent with good planning and budgeting practices.

4 Internal Audit Report (April 2017) *Budget Management Review*, p7

5 Internal Audit Report (April 2017) *Budget Management Review*, p8

There is not a robust process for prioritising

Like any Crown entity, the budgeting and planning cycle for NZFS (and now FENZ) needs to be synchronised with the Government's budget cycle. That cycle is fixed (and does not change much from year to year). Notwithstanding that, the planning and budgeting cycle for NZFS does not engage the SLT early enough to be taking the strategic and major business decisions which materially impact on budgets and plans.

The process for assessing the trade-offs between competing priorities is unclear and not documented. In theory the Senior Leadership Team (SLT) is the forum for doing this. However, a lot of relatively small scale initiatives and projects percolate up to SLT for decision making which crowds out the time of SLT to focus in bigger picture strategic priorities and plans. This lengthens decision making timeframes and limits the amount of strategic focus neither or which are conducive to effective planning.

There is a Strategic Programme Office (SPO) and Programme Governance Committee (PGC). Their roles, among other things, include being guardians of the process for obtaining approval for projects and, by implication, ensuring alignment with organisational priorities. In addition, the SPO is guardian of financial resources that can be bid for to fund projects. However, the amount of money in the "pot" managed by SPO is small (in the order of $5 million). As a consequence, only relatively small projects come through the door of the SPO (and onto the PGC). The process is geared to the relatively immaterial whereas there is no defined process for planning/prioritising major programmes and projects other than a process of consideration by SLT. Moreover, typically the SPO "pot" is not fully subscribed; unspent money is redirected to property and fleet.

There are issues with integration

Plans and budgets are not as well integrated as they could be in several respects.

- Plans and budgets are developed for individual business groups but there are not well defined processes for ensuring that these are integrated, coherent and consistent as a whole.

- There is no overarching business plan.
- Long term asset plans (property and fleet), are not as well integrated as they need to be, including with financial plans.
- During 2016/17, the transition programme was in full swing in the lead up to the establishment of FENZ on 1 July 2017. Many initiatives were underway under the umbrella of the transition programme. There was no clear process, however, for ensuring that work in the transition programme wasn't cutting across work being undertaken in the rest of the organisation (and vice versa).
- There is a multiplicity of business plans; in the order of 20 for NHQ plus plans for each area (of which there are 25). There is no process for collating and synthesising these and overlaying them with, or aligning with, an organisation-wide plan.
- There are templates to assist planning and budgeting but there is an inconsistent look and feel across plans which does not facilitate integration.

Capability and capacity

The corporate centre is lean

The amount of support available to business group managers to plan and budget is relatively modest. Management accountants from the Finance team visit the regions and meet with NHQ cost centre managers as part of the annual budget setting process to explain the rationale behind the budgets and to make any adjustments based on regional or cost centre manager feedback. However, there are few management accountants (four) and they are spread thinly across the organisation. In general, the finance function and corporate services generally within NZFS were lean.

There are limitations with some information management tools

In the property area, although there are elements of an Asset Management System (AMS) in place, there is not a fully developed or integrated AMS. Similarly, there is a need for a comprehensive information database (Asset Management Information System) that has functionality over and above that which is currently available.

There are issues with the accounting software used by NZFS - JD Edwards (JDE). The software is designed to integrate information management systems (eg HMIS, FMIS) to provide an holistic view of an organisation, and to support an integrated planning process. However, NZFS have experienced issues with use of the software the impact of which is that it does not support planning and budgeting processes as well as desired (for example, there are limitations with reporting functionality).

There are weaknesses with current financial and management reporting

We have recently completed a review of financial and management reporting. That review concluded that existing reporting does not support accountability and decision making as well as it should. One of the main findings was that reporting needs to be more strategic, forward-looking and longer term in focus and better linked to impacts and outcomes.

Improvements to financial and management reporting need to be complemented by strengthening expectations on managers to use the reports for decision making.

There may be gaps in financial management skills

Although the scope of this review hasn't extended to assessing the financial management capabilities of business unit managers, comments made by several interviewees suggest that there may be gaps in some areas. Raising levels of financial management literacy may enable managers to make better use of financial and management reports and spur more effective input to planning and budgeting processes (as well as accountability for plans and budgets). It may also reduce reliance on the finance team.

Opportunities for improvement

As summarised in the introduction section, there is significant work underway within FENZ to improve processes in relation to planning (and budgeting).

Accordingly, most of the suggestions for improvement below are already factored into the work being undertaken by FENZ.

In brief, there are opportunities for improvement with respect to each off the four areas described above.

Strategy

The organisation needs to take a much more strategic approach to planning (and budgeting). Development of a strategy is a part of this. In addition, however, there is a need to develop frameworks which help to guide the allocation of resources and triage new spending proposals as they arise. The planning and budget process needs to accommodate a strategic planning phase that has more substance than that which existed in FY17.

Culture

There is a need for greater accountability within the organisation including in relation to the setting and management of plans and budgets. There is a need to decouple the perception held by many business unit managers that because the approach to budgeting is heavily centralised, their accountability for delivery against plans and budgets is diminished. Centralised approaches to budgeting does not mean less accountability for budgeting and planning but it does mean a need to be more vigilant in counteracting the potential unintended consequences of a centralised approach.

Managers need to make more use of the information they receive. This includes taking the time to analyse and leverage it to inform planning and manage their areas of responsibility.

Process

Planning needs to inform budgets to a greater extent than it does currently. In turn, planning needs to be informed by strategy and strategic priorities and there needs to be more focus on, and accountability for, the development of strategy and determination of priorities.

Budgets and plans need to become much more integrated in the sense of:

- across the organisation
- with financial plans and finance strategy
- with financial and management reporting.

Capability

There are opportunities to strengthen capabilities in several areas with a view to better supporting planning and budgeting.

As discussed in more depth in our earlier report on financial and management reporting, changes to the scope of what is reported and how it is reported are needed in order to better inform decision making and accountability.

There needs to be clearer expectations set for managers in terms of how they are supposed to use financial and management information for planning and ongoing management purposes.

There may be a need to invest in financial management training for business unit managers.

There is need for further investment in tools to support budgeting and planning (for example, asset management systems and supporting asset management information systems).

There is also need to invest in corporate capability to better support business group managers in developing plans and budgets.

Budgeting

3. Levy forecasting

Introduction

NZFS is primarily funded through levies, paid as a part of insurance premiums on residential and non-residential property, as well as motor vehicles. The rate and application of levies has remained relatively static over the past 10 or so years. However, the transition to FENZ has triggered an opportunity to review levy settings and the approach to forecasting levies.

Table 1 below summarises the levy rates pre and post 1 July 2017 (FENZ establishment date):

Table 1: Levy rates pre and post 1 July 2017

	Levy pre-1 July 2017	Levy post 1 July 2017
Residential property	7.60 cents per $100 insured	10.60 cents per $100 insured
	Insured amounts capped at:	Insured amounts capped at:
	$100,000 for residential buildings	$100,000 for residential buildings
	$20,000 for contents	$20,000 for contents
Non-Residential property	7.60 cents per $100 insured	10.60 cents per $100 insured
	Uncapped	Uncapped
Motor Vehicles (less than 3.5 tonnes)	$6.08	$8.45
	Flat rate	Flat rate

The terms of reference require a review of the levy forecasting process performed in FY17. It is important to note that significant changes to levy settings are anticipated for 2019. Accordingly, comments relating to the approach to FY17 levy forecasts need to be seen in the context of impending levy changes which may spur the need for changes to forecasting approach.

Overview

NZFS forecasts levy revenue from two perspectives:

1. levy revenue is forecast on a monthly basis to track performance against budget and manage the organisation's cash flow, and
2. levy revenue is forecast on an annual basis for inclusion in the organisation's budget and external accountability documents (SPE and SoI).

In addition to forecasting levy revenue, FENZ is now beginning to forecast the size of the levy base. The expected size of the levy base is an important input into the levy setting process. As such, this exercise has become important with the transition to FENZ and the new legislative requirements for regular levy consultation.

Monthly levy revenue forecast

The monthly levy revenue forecasting process is sound. Where information is provided, it is capable of identifying significant variances and reflecting these in a 'normalised' forecast position.

The process has become more robust in recent years, primarily through the introduction in 2012 of a legislative requirement for some levy payers to provide detailed levy information. The information includes all levies greater than $1,000 per annum, paid by insurance brokers and direct levy payers. All New Zealand insurance companies also provide this information on a voluntary basis. This detailed information is captured in a database referred to as "Bordeaux" [6].

However, this improvement in visibility of levy information accounts for less than half of all levy income. The majority of levy income, including contract

6 Bordeaux is an Access database that contains 'Form 6' information submitted by insurance companies.

works payments, remains difficult to forecast. The recent increase in commercial and residential construction projects has seen contract works payments increase materially, contributing to positive variances in levy income (against budget) in the past two financial years.

Figure 3 demonstrates the levy income profile across a 12-month period, and the proportion of that levy income over which NZFS has detailed visibility (ie the information captured in Bordeaux).

Figure 3: Monthly Levy Income FY17

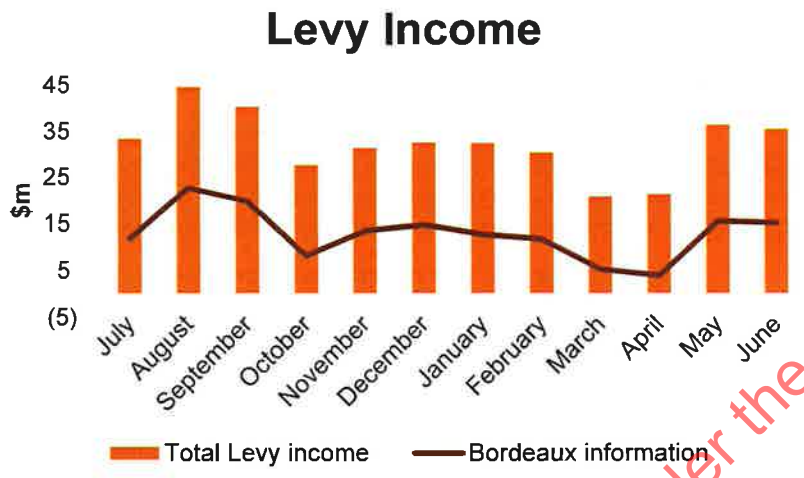


Figure 3 shows that, at times, NZFS has visibility of only 20% of the levy income, making accurate forecasting very difficult. As such, we would consider that recent positive variances of 6.5% and 4.3% in FY17 and FY16 respectively demonstrates a reasonable understanding of the levy income environment, and good use of the information available to the levy team.

We comment further on the use of information in Bordeaux and the challenges presented to the levy team, in the 'Monthly Forecasting' section below.

Annual levy revenue forecast

The forecast annual levy revenue position is included in external accountability documents including the Statement of Performance Expectations (SPE) and Annual Report.

The approach in FY17 to forecasting total annual revenue took the prior year's base revenue (ie adjusted for one-off contract works payments and interest and penalty payments) and added the expected increase in revenue across each of the non-residential, residential and motor vehicle levy categories.

Revenue growth in the non-residential, residential and motor vehicle levy categories is forecast using the following approaches.

- Non-residential levy revenue is calculated by multiplying the prior year's normalised non-residential levy position by the expected rate of GDP growth and adjusting for the proportion of commercial property that is insured (for both contract works and commercial property).
- Residential levy revenue is calculated by multiplying the expected increase in the housing stock by the maximum levy of $76 (this assumes all residential housing insured is valued greater than $100,000) and multiplying the resulting figure by 89% (which is the estimated proportion of residential properties that are insured).
- Motor vehicle levy revenue is calculated by taking the dollar value of the prior year's growth and increasing this by 2.5%. This amount is discounted to 95% (reflecting the proportion of motor vehicles registered in New Zealand that are insured).

Levy base forecast

The levy base multiplied by the levy rate determines the estimated level of levy revenue. As the levy rate has remained constant for several years, forecasting the size of the levy base has not been a priority in the past. However, with regular levy consultation required under the FENZ Act, there is a need to forecast the levy base to support the levy setting process (as well as continuing to forecast monthly levy revenue).

The approach to forecasting the levy base in FY18 is discussed briefly under the heading 'Levy-base forecasting' below.

Monthly forecasting

Calculating the normalised levy position

The process for forecasting levy revenue has been developed over time. NZFS has made good progress with levy payers and using the legislative change to ensure a more accurate forecast position.

NZFS calculates a normalised levy position by taking monthly levy revenue and deducting:

- revenue relating to past or future months, and
- contracts works payments (as these are one-off in nature).

NZFS's ability to do this was enabled by legislation introduced in 2012 requiring insurance brokers and direct levy payers to provide information on an individual levy basis (where the annual levy exceeds $1,000).

This information on annual levy payments exceeding $1,000 is viewed by the levy team through the Bordeaux database which lists the payment amount, payer name, and time span of the associated premium for each individual levy For example, the database will show that:

- ABC Company Ltd holds three residential property insurance policies with Insurer 'X'
- each policy has a commencement date of 1 June 2017 and each fire levy amounts to more than $1,000 per annum
- three levy payments were made on the 15th of August (levies are due on the 15th day of the second month following commencement of the policy) for ABC Company Limited.

The legislative requirement that took effect in 2012 has afforded NZFS a greater level of detail on levy payments, thereby allowing it to better understand the nature and timing of those levy payments caught by the legislative requirements. In turn, this assists with determining the organisation's 'base' level of levy funding.

Although the legislative requirement does not extend to insurance companies, nevertheless all NZ based insurers currently provide this information voluntarily. This means that NZFS is able to track individual payments and where they are not received as expected, adjust forecasts accordingly and identify a more reliable normalised levy revenue estimate to include in the rolling cash-flow position.

The information contained within Bordeaux shows the following for each month:

- payments made on policies dated in the current month
- payments made early, in relation to future months (ie where the policy renewal date is in future months)
- payments made late, in relation to prior months (ie where the policy renewal date is in months past)
- payments relating to Contracts Works. These payments are 'one-off' in nature and therefore not considered within the normalised position
- payments relating to the current month that haven't been paid
- payments relating to the current month that were paid in prior months
- payments relating to interest and penalties on the above late payments
- credits taken for over paid levy.

The method for arriving at the normalised position is demonstrated below (using figures for July 2016).

Table 2: Calculating the normalised levy revenue position

	$
Total Levy Revenue Received	33,436,887
Payments Received Early[7]	(1,402,839)
Payments Received Late[8]	(1,290,392)
Contract Works Payments	(709,968)
July Payments Received Early	790,999
July Payments Received Late	1,391,595
Normalised July Levy Revenue	**32,216,282**

Table 2 shows a net decrease of $1.2m between revenue received in the month, and revenue received that relates to that month's typical levy position. Calculating the normalised position to take forward in the full year forecast is an important process as it helps to ensure the accuracy of the organisation's 12 month rolling forecast. The net monthly movement fluctuates between months (between a negative variance of $1.6m and positive variance of $1m in the 12 months to June 2017).

Routine audit process

The levy team includes personnel who are responsible for auditing levy payers (insurance companies, insurance brokers and direct payers) each year. A selection of approximately 25 levy payers are audited; made up of around two insurance companies, eight insurance brokers and 15 direct payers. The timing and quantum of levy payments are scrutinised, and payments made early or late are queried.

7 Relating to months in the future

8 Relating to months in the past

The majority of the focus and time spent is on the insurance companies as these payers contribute the majority of levy revenue (for example, one of the major insurers pays approximately 50% of total levy income). Their payments are also made through automated systems. Although somewhat counter-intuitive, automation carries with it an increased likelihood of payments not being at the expected time (the reasons for this are unknown).

Unknown variables

The information within Bordeaux accounts for on average 40% of the total levy income received in a month. This means that there is around $15-20 million of income per month that the levy team is unable to see in any detail. This creates issues for NZFS in two major respects.

Contract works

Identified contract works payments represent anywhere between 1% and 6% of the total levy income in a month. Further to NZFS having virtually no visibility over the quantum of expected contract works payments, if the final value of a construction project is above or below that upon which the original levy is paid, FENZ can be owed money from, or owe money to, the payer. In the case where the levy payer has over paid, they are able to deduct this value from any future payments or request a refund at any time – this can have material negative cash flow implications for FENZ, with FENZ having little ability to control or mitigate against this risk.

Changes to insurance particulars

The lack if in-depth visibility over the majority of the levy payments means that changes to insurance policies can make it difficult for FENZ to anticipate the level of levy revenue expected each month. Examples of this include:

- Change in premium date
  - Insurers can extend or bring forward policy renewal dates as they please, meaning FENZ cannot assume payments relate to a 12-month period.
- Extension of policy date

- Insurers can extend the policy renewal date, with insured parties making interim premium payments until the new policy start date. This means irregular levy payments are made to FENZ.

- Change in policy structure
  - Insured parties can insure multiple properties for their total value or insure on a first loss basis, reducing the premium they pay (and therefore the fire levy), and they can switch between the two policy structures as they wish. FENZ have no visibility over when insured parties may choose to do this and the expected value of the new levy owing.

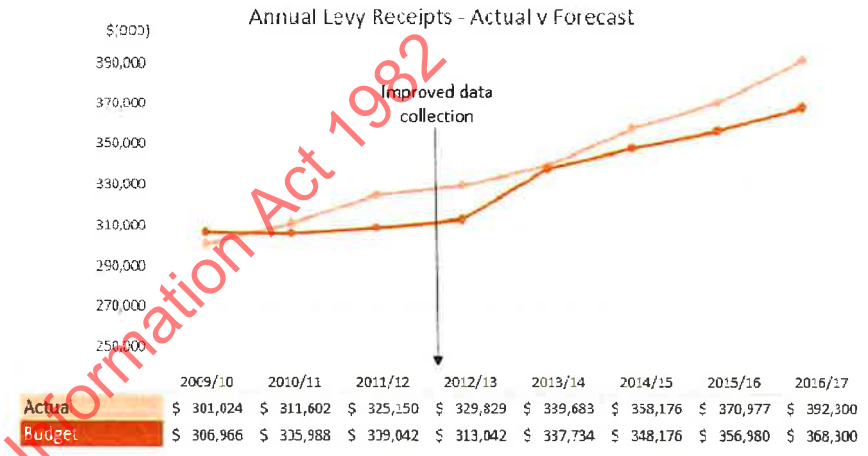
Improvement opportunities

FENZ has made good headway in negotiating the release of detailed levy payment information with levy payers. The team continue to enhance the quality of this information, discussing ways to improve the 'standardisation' of levy payments with insurance companies. This includes encouraging them to review their payment systems and improve consistency of payments. As it stands, payments can seem to be made at random and insurers have little clarity over the payments being made. This creates cash-flow problems for both the insurer and NZFS. FENZ should continue to foster these relationships, helping to create consistency of payments and improve cash-flow management. Improving the accuracy of payment dates will improve confidence in information received and will reduce the requirement for visibility over an expanded data set (ie those payments less than $1,000).

Figure 4 shows the performance of revenue forecasts against actual over the past eight years.

- The forecast and actual lines begin to come together after the passing of legislation in 2012 granting NZFS increased visibility of levy information.
- However, in recent years the gap between budget and actual levy revenue has been widening, generally because of GDP growing at a rate higher than expected.

Figure 4: Budget v Actual Levy Revenue



	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17
Actual	$ 301,024	$ 311,602	$ 325,150	$ 329,829	$ 339,683	$ 358,176	$ 370,977	$ 392,300
Budget	$ 306,966	$ 335,988	$ 339,042	$ 313,042	$ 337,734	$ 348,176	$ 356,980	$ 368,300

Aside from working with insurance companies to generate more reliable data, opportunities to improve visibility of levy revenue are not short term in nature.

- Contract works payments – FENZ could continue to foster existing relationships with the major residential and non-residential property construction companies, aiming to improve clarity on the value of upcoming construction projects (and therefore determine expected contract works levy payments). FENZ's ability to get this information may depend on the effort required by construction companies to provide this information.
- Levy payments less than $1,000 – FENZ is unlikely to receive detailed information on these policies. This is because the volume of data involved would impose high compliance costs on levy payers and high administration costs on FENZ in terms of analysing and managing the data to generate useful information.

In short, the levy team are able to forecast levy revenue to within an acceptable margin, with the limited information they have available to them. Their approach is robust and sensible, and they are working with the relevant parties

to improve the levy payment process and value and detail of information they receive, within reasonable expectations.

Annual forecasting

In preparation for the financial year ahead, NZFS forecast total expected levy revenue and include this within important external accountability documents such as the SPE.

In summary, the team take the normalised levy position (ie levy revenue less interest and penalties and 'one off' receipts) and add to this the expected growth in revenue for each of the levy categories.

Non-Residential

Non-residential levy accounts for the largest proportion of total levy income. Non-residential levy revenue is received in relation to contract works and commercial property insurance policies.

To determine the growth of non-residential levy revenue in FY17, NZFS took the FY16 normalised non-residential levy revenue (being 55% of the normalised levy) and multiplied this by the rate of GDP growth. This figure is then discounted to 95%[9] to take account of policies held on a first loss basis.

The non-residential levy is split between contract works and commercial property, at a ratio of 30:70 respectively. Despite the nature and timing of the levy revenues between the two being vastly different (eg contract works payments are typically one-off whereas commercial payments are made annually), the approach to their forecasting is the same. This reflects the fact that GDP growth is the main underlying factor that affects both revenue sources.

Table 3 outlines the approach taken to forecasting the non-residential levy revenue from contract works policies for FY17.

Table 3: Non-Residential Levy Revenue Calculation – Contract works

	$m
FY16 normalised levy revenue	363
Proportion relating to non-residential (55%)	200
Proportion relating to Contract Works (30%)	60
GDP growth at 2.1%	1.26
Multiplied by 95% (first loss policies)	1.19
Additional levy revenue forecast for FY17	**1.19**

Table 4 outlines the approach taken to forecasting the non-residential levy revenue from commercial property policies for FY17.

Table 4: Non-Residential Levy Revenue Calculation - Commercial

	$m
FY16 normalised levy revenue	363
Proportion relating to non-residential (55%)	200
Proportion relating to Commercial (70%)	140
GDP growth at 2.1%	2.93
Multiplied by 95% (first loss policies)	2.79
Additional levy revenue forecast for FY17	**2.79**

Residential

Residential levy is the next largest levy revenue category. Residential and personal property levies effectively work as a flat rate, because the capped value to which they apply is much less than the average value of residential and personal property insured by New Zealanders. The $100,000 cap that applies to

[9] NZFS calculates this discount rate assumption using historical data on the percentage of properties whose insurance premiums do not grow in line with GDP (ie first loss insurance policies).

residential property was set in 1994 when only 25% of the housing stock had a value greater than $100,000.

To calculate the growth in levy revenue expected from residential property policies, NZFS takes the expected increase in residential properties in the year and multiplies this by $76. This makes the (reasonable) assumption that all insured properties have a value greater than $100,000. The resulting figure is multiplied by 89%[10] to reflect the estimated proportion of residential properties that are insured.

Table 5 outlines the approach taken to forecasting the growth in residential levy revenue for FY17.

Table 5: Residential Property Levy Base Calculation

	$m
Expected increase in housing stock (#)	23,000
Multiplied by flat rate of $76	1.75
Multiplied by 89% (estimated proportion of residential properties that are insured)	1.55
Additional levy revenue forecast for FY17	**1.55**

Motor Vehicle

The motor vehicle levy works differently to the non-residential and residential levies, in that a flat rate applies for each motor vehicle insured (this only applied to full-cover policies in FY17).

The forecast growth in this category of levy revenue was calculated in FY17 by taking the growth expected in FY16 and increasing this by 2.5% to reflect expected growth in the number of motor vehicles registered in New Zealand in the year. FENZ note that this rate of growth is slightly higher than actual growth. The difference is intended to take account of the decreasing cost of vehicle registration in New Zealand (ie it assumes the decreasing registration cost has a positive impact on the number of vehicles registered). This is then discounted to 95%[11], to reflect the proportion of vehicles registered in New Zealand that are insured (based on NZTA information).

Table 6 outlines the approach taken to calculating the motor vehicle levy base for FY17.

Table 6: Motor Vehicle Levy Base Calculation

	$m
2015/16 expected growth	0.36
Growth increased by 2.5%	0.37
Multiplied by 95% (estimated proportion of vehicles that are insured)	0.35
Additional levy revenue forecast for FY17	**0.35**

[10] The figure of 89% has been determined with reference to data from Statistics New Zealand regarding the rate of insured residential property/dwellings in New Zealand

[11] FENZ calculates this discount rate assumption using historical data on the percentage of motor vehicles registered in New Zealand that are insured.

Total Annual Levy Revenue Forecast

Table 7 summarises the comments above and arrives as the total annual levy revenue forecast for the year.

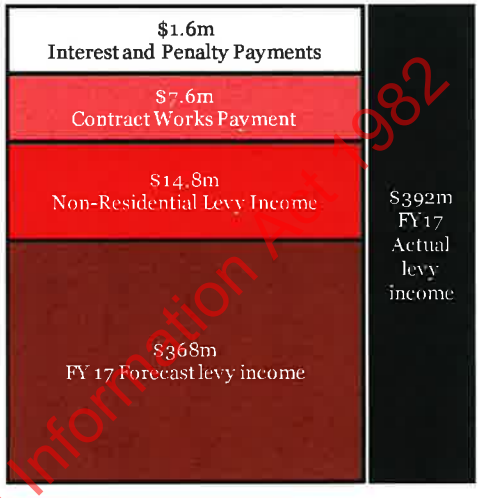
Table 7: FY17 Total Levy Revenue Forecast

	$m
FY16 Normalised Levy Revenue	362.6
Forecast growth contract works revenue	1.19
Forecast growth commercial revenue	2.79
Forecast growth residential revenue	1.55
Forecast growth motor vehicle revenue	0.35
Forecast levy revenue included in FY17 SPE	**368.4**[12]

Figure 5 summarises the variance between the expected levy revenue in FY17 (forecast income $368m) and the revenue received in that period ($392m).

For the most part, NZFS was able to reliably forecast levy revenue for FY17, notwithstanding the positive variance of $24m. The variance represents an increase on budget of approximately 6.5%.

Figure 5: Forecast v Actual Levy Revenue FY17



The majority of this variance can be attributed to the GDP growth assumption used in the forecast levy revenue calculation. NZFS used a GDP growth assumption of 2.1% which, in a long term context, is a reasonable assumption albeit a little conservative (in nominal terms). However, NZ's GDP grew closer to 6% in FY17 (well above the level of growth recorded in the two prior years).

This growth flowed through to the construction sector, and contributed to

- non-residential levies $15m greater than budgeted, and
- contract works payments $8m greater than budgeted.

In practice, neither of these out-turn positions are easily foreseen. Particularly so for contract works, given there is no reliable lead indicator to signal growth in this revenue source. We note that MBIE produce a report which presents a forward view of national construction activity. This report is released each July. This presents a timing mismatch in terms of FENZ's ability to use it for their levy revenue forecasts (ie the report produced in July 2017 is produced too late to inform the FY18 forecast).

[12] We note that this figure is calculated using detailed information provided by FENZ and differs slightly from the figure included within the SPE of $368.3.

Levy-base forecasting

Forecasting the levy base is a relatively new task for the levy team and stems from the new requirement to consult on the levy rate at regular intervals (every three years). In the course of our review, we have had sight of the current and somewhat iterative approach to forecasting the levy base for FY18 and, to some degree, FY19. Overall, we consider that the existing approach to levy forecasting is fit-for-purpose and, accordingly, do not have any specific recommendations aimed at effecting further improvements over and above the continuous improvement processes which FENZ currently has in place.

We note also that significant changes to levy arrangements are foreshadowed for implementation in July 2019. Given this, and given our overall finding, any effort aimed at improving levy forecasting would be best directed toward assessing whether changes to forecasting method and approach need to be made once more in known about future changes to the design of the levy.

4. Expenditure forecasting

Budgeting approach and context

The budgeting process is supported by sound models and assumptions on the whole, using a range of models to estimate personnel, property and fleet expenditure. In the case of ICT (which is another significant area of expenditure), business cases prepared in support of major initiatives are an important input to determining expected levels of expenditure.

Some of the financial models comprise very detailed calculations. We have not delved into the detail of these; rather attention has focused instead on the approaches and key assumptions underpinning the budgets in each of the main areas of expenditure.

Notwithstanding the extensive use of financial models to support budgeting, the very fixed cost nature of the business, and the way the business and budget process is run, means that the recent past is generally a good guide to future expenditure (in the near term) once allowances for cost inflation have been made.

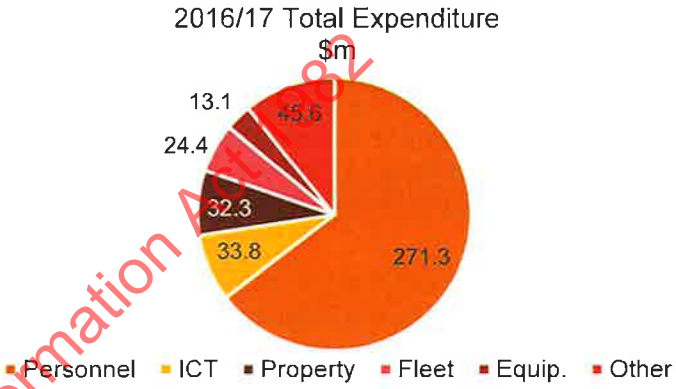
To emphasise the point, much of NZFS expenditure is incurred in maintaining readiness (approximately 61% of total budgeted expenditure for FY17). The "level" of readiness does not change much from year to year even though there is growth in the number of incidents attended.

Budgeting performance

When viewed from a year-end budget versus actual variance perspective, budgets are robust. NZFS exceeded budget in FY17 by $4.8 million or about 1.2% of the budget of $415.6m.

NZFS FY17 total actual expenditure amounted to $420.4 million. The main expenditure categories are shown in Figure 6.

Figure 6: 2016/17 Total Expenditure



In the sections below, we assess the budgeting methodology for these categories of expenditure (excluding 'Other' which comprises mainly administrative costs).

In summary, actual expenditure doesn't vary from budget materially for several reasons.

- On the whole, NZFS is a very fixed cost business. The organisation has operated a fixed headcount policy, which limits variability in personnel costs. Moreover, the business is relatively capital intensive.
- A relatively small element of annual budget is categorised as being discretionary which limits the opportunities for expenditure to move in unexpected directions.
- There is a strong culture within NZFS of the organisation seeking to live within its (financial) means.
- The Finance team monitors financial performance closely and works with the business to reallocate resources in situations where financial pressures emerge.

Overall improvement opportunities

The overall assessment is that the models and assumptions supporting expenditure budgets are fit-for-purpose. As such, there are no specific recommendations regarding opportunities for improvement, subject to two main points.

- The focus of the review is FY17 and, accordingly, has excluded budgets for rural fire services. Given the uncertainty over the condition of rural assets and the cost implications of this going forward, the process of better understanding the rural side of FENZ will have a significant bearing on the robustness of budgets.
- NZFS lacks integrated, enterprise wide long-term plans. Further to that, individual plans do not integrate with finance strategy/plans as well as they could. However, we are aware that FENZ is working to develop an integrated planning reporting and budget cycle, among other improvements to planning and budgeting.

Assessment of key expenditure items

The following sections assess the budgeting approach and areas of uncertainty for each of the key expenditure items in NZFS's budgets.

Personnel

Personnel costs account for almost two thirds of total (operating) expenditure, summing to more than $270m in FY17. As NZFS has operated with a strict headcount limit for many years, a large proportion of NZFS's annual personnel cost is relatively predictable; most of the variation relates to amounts paid to personnel rather than the number of personnel.

Assumptions

Specific assumptions are included to take into account general salary and wage, and out-of-cycle remuneration, increases. Collective Employment Agreements (CEAs) have an automatic adjustment for pay rates based on Hay data and methodology (this means that pay rates are not a key aspect of Professional Firefighter Union (PFU) negotiations). Generally speaking, remuneration payments have grown by a rate at, or near, inflation each year.

The quantity of operational personnel accounted for in the budgeting process is based on past years' experience. This is because the headcount numbers are in part a function of underlying core assumptions which have remained constant for the past few years. Important among these assumptions are the following:

- each appliance has 4 person crews – this was discussed as part of Phase One of the Operations and Performance Review
- an establishment ratio of 4.5 staff to 1 crew member (4.5:1) means that for every (4-person) truck in a station, the establishment requires 18 FTE staff. This is to ensure 24/7 coverage taking into account planned (eg annual leave, training) and unplanned (eg sick leave) absences (minimum shift manning).

In terms of support staff, there are no specific assumptions made. The fixed head count policy means that each year's budget reflects the prior year adjusted for changes in remuneration (we note that this policy may be changing under FENZ).

Areas of Uncertainty

There are some signs that the establishment ratio of 4.5:1 (relating to operational personnel), which has been in place for several years, might be becoming too lean. This is because, over time, the level of planned absence (ie unavailability) has been increasing as a result of increasing training demands (more things to be trained in) and, in recent times, demands arising from the transition to FENZ.

Other areas where there is potentially scope for variation in personnel costs is overtime, call outs and call backs. The Phase One report of the operations and performance review identified this as an area where there can be significant variance in the level of expenditure particularly when making comparisons between stations. All three of these personnel costs outside of base salary and wages are susceptible to fluctuations. These are difficult to predict given they're affected by the level of illness and other unplanned absences.

- Overtime budgets are primarily a function of historical patterns (eg based on average of the last four years for fire safety personnel).
- The cost of 'on-call' time is a function of:
  - schedules prepared by areas/regions for fire risk management officers and VSOs and rates are as per contracts negotiated with PFU and PSA
  - average number and duration of call outs over last 3 years (applies to paid stations only).
- Call backs are slightly more complicated in that they are a function of minimum shift manning, a part of contracts negotiated with unions. The cost of call backs was increasing but the number of call backs per FTE has reduced slightly in 2016/17 as a result of downward trend in the level of sick leave. Incentives to better manage the amount of sick leave have been created within the PFU contract - if sick leave budgets are underspent, areas can keep a portion of the savings to spend on risk reduction.

Notwithstanding the formulaic approach to budgeting for these personnel related costs, the scope for variance against actual expenditure remains. This is due to the impact management of personnel issues has on the outturn expenditure position. Effective personnel management has the most material positive impact on the likelihood and size of variances between budgeted and actual personnel costs (outside of base salary).

Property

From an operating perspective, property related costs account for approximately 8% of total expenditure in 2016/17 or just over $32m. From a capital perspective, investment in property typically sits at around $25m per annum with property assets accounting for around 70% of the total net book value of assets (as at 30 June 2017, Land and Buildings had a book value of $535 million). The following highlights the influences over capital and operating expenditure budgeting approaches.

Capital expenditure

While capital expenditure of around $25 million per year is more or less sufficient to maintain the existing age profile of the current property portfolio, it is not sufficient to reduce the age of the portfolio. The Building Act stipulates a design life of 50 years but about 20% of the portfolio is approaching or beyond this age. As part of the Strategic Plan for property, the objective is to maintain the average service life of fire station buildings to below 40 years and a maximum service life of 80 years. The aim is to achieve these objectives by June 2020.

Furthermore, funding capped at $25 million does not provide a buffer to address unexpected events, such as the Canterbury earthquakes, which give rise to the need for significant expenditure.

Drivers to capital expenditure

The drivers of property capital expenditure are:

- desired age profile for the portfolio and speed of adjustment to that profile
- building condition, as determined by condition assessment reports - not all buildings beyond their intended service life have obsolescence issues and equally some buildings develop such issues before reaching the end of their expected service life (this is particularly relevant in the context of rural property)
- seismic strengthening requirements
- operational/health and safety requirements (eg exhaust fume management systems, decontamination facilities)
- construction costs - nationwide there has been significant construction cost inflation driven in part by major rebuild (in Christchurch) and generally buoyant economic conditions.

Notwithstanding the above, the capital expenditure budget remains relatively static, with any and all of the above requirements for additional investment effectively slowing the achievement of the desired age profile.

In addition to the points above, there are two other factors which point to the need for additional investment, over and above "normal" levels.

Canterbury earthquakes

Following the Canterbury earthquakes, the Greater Christchurch Rebuild project involves constructing seven new career, and six volunteer, stations. The project is expected to be completed by June 2023 at a cost of $70 million. The rebuild has meant diverting funds away from the wider property portfolio, and improvements that would otherwise have been undertaken.

The project's cost has been absorbed by the 'business as usual' capital expenditure budget. This results in a bow wave of expenditure needed between 2019 and 2022 in order to reverse the effects of this on the rest of the portfolio. Additional funding for this is currently being requested.

Rural property assets

The condition and age profile of the rural property portfolio is not well-understood. A process of undertaking asset condition assessments is underway but these won't be completed for several months. The budget implications are not likely to be fully understood and reflected in budgets until FY19 (and beyond).

In addition to issues with the condition of rural fire stations inherited from RFAs, there are also issues with the configuration and composition of the rural property portfolio. Rural fire stations can include what are referred to as depots (these are unmanned facilities that essentially just provide storage for vehicles and equipment) as well as stations (ie which are manned and have facilities such as meeting rooms and ablutions). Some of the properties inherited from RFAs are little more than sheds or barns.

There is a significant piece of work to be undertaken to assess the mix and location of depots and stations required and the outcome of this is likely to be an additional cost factor, over and above the need to address asset condition issues.

Supporting tools

The property team do not have access to a comprehensive property asset management system (AMS) or supporting asset management information system (AMIS). JDE provides the property team with elements of an AMS but no specific property related asset management capability is available. Additionally the functionality available in JDE is not consistently used by the property team. The need to define and implement a comprehensive and integrated AMIS has been foreshadowed in the 2016 property strategy.

Of themselves, whether or not AMS and AMIS tools exist does not necessarily impact on budgets since it is an operational policy decision to set property budget at circa $25 million. Such tools would, however, provide much better insight regarding the adequacy of existing budgets.

Notwithstanding the lack of these tools, the property team have developed, and work to, a 25 year capital works programme. This capital plan is widely understood and is able to adapt to any necessary changes required to the portfolio as a result of the transition to FENZ. The Plan also takes into consideration the other major capital plan – the Fleet Plan.

Operational expenditure

Property related costs account for approximately 8% of total operating expenditure in FY17, or just over $32 million, nearly half of which is depreciation on buildings (approximately $14 million).

The other $18 million relates to occupancy, including maintenance. Of that, planned maintenance is the major component; the costs of which are incurred based on a detailed schedule, which is a function of asset age and condition.

In terms of the regional budgets, occupancy expenditure reflects the following assumptions.

- Personnel costs – amount to about 15% of total property operational budget. This component of expenditure remains relatively consistent given the static personnel establishment policy adopted by NZFS.

- Utilities – electricity costs are based on the current All of Government contract and are therefore relatively easy to budget for.
- Rates – the previous year's expenditure is increased by 4% to account for increases in the value of the property market.

With regard to depreciation, on an asset by asset basis this varies between 1% and 10% depending on building type. The budget also allows for 3% revaluation of applicable properties.

Areas of Uncertainty

With respect to both capital and operational property expenditure, FENZ has operational policy decisions to make as to how quickly it wants to achieve the desired age profile target.

In addition, the condition of rural assets is unknown. Early signs indicate that rural fire property will require significant investment or interim maintenance which may impact on the need for asset replacement and, hence, how quickly the target age profile is achieved.

Fleet

Fleet expenses account for nearly 6% of total expenditure in FY17 (approximately $24 million). The amount invested annually in fleet is similar to property, with a budget of circa $20 million in FY17. Fleet comprises 20% of the value of the total asset base.

Capital expenditure

The fleet budget for FY17 was around $20 million. However in FY17, actual investment in fleet was only approximately $10 million. This underspend stems mainly from delays experienced in delivering the MAN truck project[13].

[13] The MAN project comprised the delivery of 47 new Type 3 MAN vehicles, completed in FY18.

Fleet has a strategic plan (albeit becoming outdated)

While investment is guided by an underpinning strategic plan, the plan is becoming a bit dated with the latest version published in October 2015. The plan is largely oriented toward fleet replacement, with the rate of replacement governed by the desired age profile. The current (urban) fleet does not meet the target of '90% of appliances are less than target replacement age'. The proportion of assets which are less than target replacement age currently sits at 75%.

Fleet composition is subject to change

To date, the size of the fleet portfolio has remained relatively static, reflecting little change in the footprint and number of stations across the country (Christchurch and rural excepted).

There are, however, potential changes over time with respect to the composition of fleet, in both the type of vehicles and the way in which vehicles are configured for equipment storage. In both cases, changes are in the nature of diversifying types and fit-out. While a base capability of double cab truck with pumps will still be needed, other types of vehicle are increasingly being needed reflecting the diversity of emergencies attended by FENZ.

These changes will affect fleet operational and capital expenditure budgets and will likely mean an expansion of the asset base, as opposed to direct replacements within the asset base (eg 4WD vehicles would be an addition to a station's fleet, rather than a replacement of a double-cab truck). The associated additional costs, if not funded as external to the BAU budget, may have the potential to further delay the achievement of the 90% target.

Rural fleet assets

Fleet is similar to property in that relatively little is known about the state of the rural fleet inherited from RFAs. That said, indications are that vehicle condition, age and composition (in terms of way vehicles are equipped/fitted out) are not as fit-for-purpose as the urban fleet. Condition assessments are due to be undertaken in the coming months and assuming there is catch-up required, the intention is that the financial cost will be spread over several (10) years.

At this point, $2 million is provided for in the baseline for the upgrade of rural fleet but that is unlikely to be sufficient to align the age profile of the rural fleet with target. FENZ has estimated another $4 million each year for 10 years may be required to achieve target.

Operational expenditure

Total fleet operational expenditure came to just over $24 million in FY17, of which $11m related to depreciation. Of the other $13 million, the cost which has the greatest potential for fluctuation is fuel (albeit this is a relatively small proportion of overall cost).

Fuel costs were $1 million in FY17. From a budgeting perspective, response to a 'normal' volume and mix of incidents is included and, therefore, expected consumption can be estimated with a relatively high degree of certainty. The more uncertain variable in the calculation is price (although fuel is bought under contract rather than at spot prices at the pump). Accurately forecasting the price of fuel 12 months into the future is challenging and not something that we would expect NZFS to undertake (other than relying on forecasts made by others).

Costs included in the remaining $12 million generally do not fluctuate significantly in the short term.

- Maintenance costs are influenced by the age profile of the fleet (newer vehicles are generally more reliable and give rise to less unscheduled maintenance). High maintenance costs can also trigger the need for asset replacement. The risk of maintenance costs escalating above plan are considered by FENZ to be relatively low given planned maintenance schedules and close monitoring of maintenance and repair providers.
- Road User Charges (RUC) can be forecast with a relatively high degree of certainty because the distance travelled by the fleet does not vary much from year to year. Changes to RUC rates are infrequent and usually well signposted by NZTA.

Areas of Uncertainty

With respect to both capital and operational fleet expenditure, FENZ have operational policy decisions to make as to how quickly they want to achieve the desired age profile target.

Compounding the above, less is known about the condition of rural fleet. Early signs indicate that rural fire vehicles will require significant investment or interim maintenance which, in part, will depend on how quickly the target age profile is to be achieved.

ICT

ICT operating expenditure was $34 million in FY17, including $15 million of depreciation. Investment in communications and IT equipment amounted to $22 million in FY17 (compared to a budget of $10 million).

The significant investment in ICT over and above budget was driven primarily by the decision to capitalise costs associated with the paging network (these amounted to $8.7 million).

Approach

The approach to ICT budgeting differs from fleet and property in several respects.

- There is no underpinning strategic plan governing investment in ICT (the last ICT strategic plan covered the period 2012-14)[14]. There is, however, a transformation document (finalised in 2016) which describes the direction for ICT and, essentially, sets out the strategic case for the transformation.
- Investment in ICT is driven by technological advancements that better support and enable organisational efficiency and effectiveness, as opposed to asset replacement.

[14] It is normally expected that government agencies will have fully developed an integrated strategic plans for people, technology and, where relevant, property.

- ICT projects tend to be a combination of a small number of large projects (eg mobility project, IGC radio replacement, paging network) and a larger number of smaller initiatives.
- Budgets are not determined by models. Instead, the robustness of the ICT budget is largely a function of the underlying business cases prepared in support of the major initiatives (such as the mobility project).

At the aggregate level, the FY17 ICT budget could be described as not being very robust for two reasons; the lack of a strategic plan and that fact that Better Administrative Support Services (BASS) benchmarking indicates that expenditure on ICT in NZFS has historically been low compared to other large organisations.

The historically low level of ICT expenditure is unlikely to be sustainable without materially compromising wider organisational efficiency and effectiveness. There are already many known issues with existing systems, including issues regarding lack of integration between systems and issues stemming from a historical lack of investment in systems (eg no comprehensive asset management systems). Further under-investment in this area will, potentially, only compound these issues[15].

If robustness is defined in the sense of the accuracy with which future costs are estimated, the picture is mixed. This reflects the status of underlying projects and activity. BAU activity is known with reasonable certainty as are projects which are in train. Conversely, the further out budgets look, the more those budgets incorporate projects, the timing, scope and cost of which is much less certain.

Areas of Uncertainty

The quantum and pace of ICT capital and operating expenditure is planned in a less structured manner than the other key expenditure areas, and has the greatest potential for variation particularly in regard to the long-term. In short:

- the robustness of budgets rely solely on the underlying business cases prepared in support of major initiatives (and, in general, business cases can often suffer from biases in overstating benefits and understating costs)
- the timing and scope of projects becomes more uncertain the further into the future the expenditure is forecast.

[15] We note that more recent budgets and forecasts for ICT have foreshadowed a significant increase in expenditure.

5. Variances

Overview

Operating expenditure

Budget expenditure for FY17 was $415.572 million. Actual expenditure was $420.416 million; a variance of $4.844 million or slightly under 1.2% of budget.

The main areas of operating expenditure variance are summarised in the table below.

Table 8: Variance analysis

	Variance $000s
Over-expenditure	
Major fires/events	7,686
Travel	2,199
Property maintenance	847
Clothing/equipment/consumables	627
Grants and donations	324
R&D, Other operating costs and depreciation	680
Sub-total over-expenditure	**12,363**
Less under-expenditure	
Personnel- related	3,200
Communications and computer costs	2,500
Professional fees	1,819
Sub-total under-expenditure	**7,519**
Total variance	**4,844**

Capital expenditure

Net capital expenditure amounted to $48.9 million compared to budget of $47.9 million. Although the variance is small, there was an underlying under-expenditure in NZFS capital expenditure ($4.5 million) and the transition project ($0.5 million) that was more than offset by lower than expected disposal receipts (variance of $6.0 million).

Reasons behind the variances

Operating expenditure

The main driver of over-expenditure is responses to major events such as the Port Hills fire and the Kaikōura earthquakes. In addition to the direct costs involved, these major events have also led to increases in the amount of travel as well as small increases in the amounts spent on clothing, equipment and consumables.

The reasons for under-expenditure are specific to each of the expenditure areas listed in the table above.

- The settlement of an employment agreement for operational staff came in under budget. New arrangements have been agreed as part of collective agreements the effect of which is to strengthen incentives for more effective management of sick leave. Training costs were under budget reflecting reduced attendances and some cancelled courses.
- Delayed ICT projects resulted in lower than expected communications and computer costs. Generally speaking, many organisations are overly optimistic regarding the pace with which ICT projects are implemented and the same has been true of NZFS. In addition, the costs associated with the paging network are now being capitalised.
- The lower than expected level of professional fees related mainly to the transition project and, to a lesser extent, delays in the availability and messaging project resulting from a commercial risk identified in pre-contract negotiations that needed to be addressed before making further progress.

Capital expenditure

Delays in the fleet acquisition programme was partially offset by the impact of capitalising costs associated with the paging network project. The lower than expected disposal proceeds reflected delays with a sale and lease back of IGC radios.

Scope to better anticipate and reduce variances

Overall, the amount of net over-expenditure (operating and capital) is relatively small and needs to be seen in the context of levy revenues being well in excess of budget ($392.3 million actual on accrual basis compared to budget of $368.4 million).

Like any organisation, steps should continue to be taken to better anticipate changes in expenditure but, for several reasons, we conclude that there is nothing arising from the variances listed above that point to a need for major changes to the way in which expenditure is forecast.

Most of the over-expenditure is driven by major natural events which, by definition, cannot be predicted. By implication, the financial impact and timing of such events is unknown. Responding to major events is not explicitly budgeted for (other than in the sense of maintaining cash reserves). Accordingly, when such events occur, they give rise to an unfavourable expenditure variance.

Much of the under-expenditure reflects initiatives not proceeding to plan. The solution to this is not better financial forecasting; rather, the underlying issue is whether management of initiatives could be tighter. In general, there may always be scope to improve management but, in the specific case of the ICT delays noted above, the underlying reason for delay does not appear to have been as a result of insufficient management attention.

To the extent that the pace of initiatives will vary relative to plan, the issue is not primarily one of trying to improve financial forecasting but, rather, one of having the agility to respond to delays in one area by ramping up activity in another area. This is the approach taken by NZFS and although it is not indicated in the aggregate variance numbers, at a more micro level there are many small variances which, in the aggregate, largely offset one another. The role of finance in this situation is maintain good awareness of the progress with initiatives and ensure there are processes for sending the early warning signs of initiatives not running to plan so as to maximise the opportunity to reprioritise and reallocate resources within the overall budget envelope.

Benefits

6. Review of the nine activity categories

Introduction

It is important that FENZ can articulate the benefits it delivers to New Zealand communities. Moreover, it is desirable to draw a line of sight between what FENZ does and the benefits that are generated.

FENZ undertakes a broad range of reduction, readiness, response and recovery roles (referred to as the four "Rs"). In total there are around 120 different activity codes recorded in FENZ's station management system (referred to as SMS and which is a core database used for recording FENZ activity). As part of the development of an activity based costing (ABC) model, FENZ has undertaken work to group the activities into nine main categories (these are listed below together with examples of the activities within each category).

The ToR have required us to review the activity categories with a view to assessing whether or not they provide a useful framework for thinking about the benefits which stem from the roles performed by FENZ and whether they provide a sensible line of sight between what FENZ does and the benefits the organisation delivers.

Nine activity categories

Table 9 lists the activity categories included in FENZ's ABC model.

Table 9: FENZ activity categories

Activity category	Example of specific activities
Fire response	Structure fire, vegetation fire
Hazardous substances	Biohazard emergency
Motor vehicle	Rescue: in or under vehicle
Medical response	Medical call: no ambulance present
Severe weather	Earthquake, flood
Urban search and rescue	Collapsed structure rescue
Other response and rescue	Power line down, animal rescue
Education	Public awareness campaigns, school visits
Fire prevention	Input to building regulations, evacuation scheme approvals, building inspections

Assessment

In summary, we consider that the nine activity categories are appropriate as a framework within which the benefits stemming from FENZ's work can be described. No changes to the activity categories are recommended. Our reasons for this are as follows.

- The activity categories provide comprehensive coverage of what FENZ does (the four "Rs"), they capture the fire and non-fire roles performed by FENZ and they align with FENZ's roles as set out in the organisation's governing legislation.
- The categories are comprehensive (and align with legislative mandate as set out in the Fire and Emergency Act 2017). It is likely that the categories will withstand the test of time (ie over time there may well be some changes to the nature and scope of what FENZ does but it is likely that any such changes would nonetheless fit within the existing activity categories).
- Each activity category is distinct which helps when drawing line of sight to benefits.
- Each activity category is material in its own right.
- FENZ personnel interviewed as part of the review were supportive of the categories and the process used for developing them involved a range of FENZ personnel.

We note that we have not sought to undertake a comprehensive review of the activities within each of the nine main activity categories. We have, however, performed a sense check across the activity categories to ensure they reasonably represent FENZ's activities. Based on this assessment, we conclude that the nine activity categories and the activities within each of these are appropriate.

7. Approaches to measuring benefits

Introduction

A range of benefits has been identified based on discussions with FENZ personnel and a workshop involving FENZ and DIA personnel. The approach to identifying and prioritising the benefits is outlined in Appendix A.

This section describes possible approaches to measuring and quantifying the priority benefits which were identified from the process described above. These are laid-out in Table 10 through to Table 19. Broadly speaking, each benefit falls into one of the following types.

1 **Quantifiable in monetary terms** – These benefits can be assigned an economic value, expressed in dollar terms, and can be used for the purpose of attributing a value to FENZ's activities.

2 **Quantifiable in non-monetary terms** – These benefits cannot be easily or reliably measured in monetary terms but they can be quantifiably measured/counted or assigned a numeric amount, the quantum of which can be used to determine a change in the benefits for each period.

3 **Qualitative** – These benefits cannot be easily or reliably measured or counted, and require case studies or other such evidence to demonstrate their magnitude or degree of change.

Most of the benefits are quantifiable in non-monetary terms and the majority of these are also capable of being quantified in monetary terms. However, none of the benefits are currently measured.

The amount of work that is involved in measuring the benefits is variable. In some instances, data needed for benefits measurement is already being collected but there are gaps in information (benefits measurement usually relies on several variables). In other instances, there is currently little or no existing information to inform benefits measurement or there are significant obstacles to being able to define the scope of benefits in a conceptual sense. On this latter point, a key issue that arises across several benefits is the problem of trying to defining the counterfactual.

Defining the counterfactual

The focus of the review is on the benefits stemming from the activities undertaken by FENZ. In order to measure benefits, there needs to be a clear view of what is being compared against what. In plain English, the benefits stemming from FENZ's activities depends on what the situation would have been had FENZ not been involved (this is the counterfactual).

For example, the level of harm avoided by responding to a fire is a function of the amount of harm that would have occurred had FENZ not attended that fire less the amount of harm that resulted from the fire even though FENZ did attend.

Defining the counterfactual is inherently challenging because it cannot be observed. Without any observable counterfactual, assumptions need to be made about what the counterfactual could look like, or alternatively, boundaries need to be drawn around the value to prevent extreme and unrealistic estimates of the value that FENZ provides.

This is not an issue specific to this review. We note for example a report to the Commission prepared by MartinJenkins (2012) which proposed a performance monitoring framework to provide a stronger link between expenditure on, and the benefits of, fire safety education programmes and outcomes[16]. That report outlined the difficulty with measuring value stemming from preventative activities because the value is contingent on a counterfactual that cannot be measured.

Where possible, we address the counterfactual issue by suggesting some approaches to developing proxy measures of the counterfactual.

16 MartinJenkins. (2012). *Developing a methodology for establishing a stronger line of sight between expenditure and outcomes*. New Zealand Fire Service Commission Research Report Number 125.

Assigning benefit owners

It is important that FENZ is able to demonstrate the benefits it delivers to New Zealand. Assigning benefits owners will ensure that the organisation engages with the benefits framework and is committed to measuring the benefits within the framework. It should be noted that the benefit owner is not accountable for the final quantum of the benefit; rather they are responsible for ensuring a process is followed to measure the benefits. They may also have a role in providing oversight of, and advice in relation to, whether FENZ is undertaking the right level and mix of activities in order to deliver the benefits expected.

Accordingly, FENZ needs to assign benefit owners. Based on our knowledge of roles and responsibilities within the organisation, we suggest that the Business Effectiveness team or the Office of the Chief Executive would be appropriate areas to take on this responsibility. Ideally, ownership responsibility needs to be assigned to one or more individuals within these areas.

Potential approaches to benefits measures

Outlined below are the priority benefits and the approach to their measurement, together with data sources. The list of benefits is not intended to be exhaustive. Following discussions with FENZ personnel, and taking into account the challenges in trying to measure the benefits stemming from FENZ's activities, the focus has gone on those benefits which, at the workshop with FENZ and DIA personnel, were considered to have a realistic prospect of being measurable. That said, however, there are some benefits (eg minimising environmental damage) where initial expectations regarding measurability may prove to have been too optimistic. Equally, there are some benefits where we have been able to identify an approach to measuring some, but not all aspects of the benefit. A good example of this is in relation to property damage. We have identified an approach to measuring the benefit of minimising the cost of structure damage. However, because of information limitations, we have stopped short of addressing other associated impacts such as the time and costs incurred by individuals and/or businesses in getting "back on their feet" following a structure fire.

Where possible we have referred to external sources of research and data that can assist with measurement and quantification of benefits. Some of these sources are becoming dated, or have only been researched in the context of specific circumstances. Therefore, FENZ may need to commission research to obtain more up-to-date measures or to develop measures that are better tailored to FENZ's situation. For the monetary benefits, in some areas we have adjusted historical numbers to convert them into 2017 values.

Table 10: Prevention of harm

Sub-benefits	Measurement approaches	Existing measures and information sources
Saving lives	The benefit that comes from saving lives is a function of the number of fatalities avoided and the value that attaches to life.	
	Number of fatalities avoided There is a need to establish the counterfactual; that is, how many lives would have been lost were it not for FENZ's intervention. This is not directly observable and, accordingly, assumptions have to be made. In the context of structure fires, one approach to this is to review incident reports where FENZ has assisted with evacuation with a view to identifying which of these was undertaken in a clearly life-threatening situation[17].	Number of fatalities avoided In the context of structure fires, Challands[18] found no discernible relationship between response times and the occurrence of fatalities. A possible explanation for this is that in a fire situation, most people self-evacuate before the fire service arrives.
	Value of a statistical life The value of a statistical life (VOSL) is a measure that can be applied to the number of fatalities avoided in order to develop a monetary estimate of the benefit of lives saved. VOSL measures the amount of money that society would be willing to pay to avoid the loss of life. It should be noted that a VOSL estimated in one context might not be directly applicable in other contexts. Accordingly, fresh research of the appropriate VOSL to use in the context of fire	Value of a statistical life Ministry of Transport (2017) measures road VOSL at $4.14 million per life in June 2016 prices[19]. Adjusting this for inflation using the change in average hourly earnings[20] as per the Ministry's methodology yields a VOSL of $4.26 million per life in September 2017 prices. The Ministry also publishes the average social cost per fatality at $4.18 million per fatality. This includes VOSL, and the impacts from reduced productivity as well as medical and other

17 Defining what is meant by a life threatening situation will involve judgement. There are various agencies (such as NZ Search and Rescue) who routinely measure the number of lives saved through their activities and who have criteria to define this measure.

18 Challands, N. (2010). *The relationship between fire service response time and fire outcomes.* Fire Technology, 46(3), 665–676

19 Ministry of Transport. (2017). *Social cost of road crashes and injuries 2016 update.*

20 The Average Hourly Earnings (Infoshare reference: QEX001AA) is a data series recorded to enable calculation of the change general level of wages in the New Zealand. More information on the average Hourly Earnings by Industry can be found in the Business Price Index section of Statistics New Zealand's website

Sub-benefits	Measurement approaches	Existing measures and information sources
	and emergency services may be required. Each year, VOSL should be adjusted according to latest publications issued by the Ministry of Transport (or by updating various cost indices used in the VOSL calculations).	resource costs. Castalia Limited (2012)[21] estimated the value of life in fire situations at $2.57 million per life as at March 2012. This was estimated from a risk-based analysis of the cost of a smoke alarm at $13.50 versus the change in probability of a fatality with and without a smoke alarm.
	Response timeliness – medical and motor vehicle response Based on discussions with FENZ personnel, there is a view that the timeliness of medical response and motor vehicle accident response has benefits in terms of reducing the number of fatalities or avoiding situations where the "patient's" condition is worsened because of the length of time taken to receive medical attention. The number of medical and motor vehicle crash (MVC) responses is currently measured. In addition to the number of incidents and number of "patients", the key variable to measure is response timeliness in two respects: • how timely the response was (ie time between being notified of the emergency and FENZ arriving at the scene) • the time between FENZ's arrival at the scene (as first responder) and the arrival of other emergency responders (in particular ambulance services). A benefit of the swifter response by FENZ is that in most situations, FENZ personnel have skills that assist in stabilising the patient and preparing the patient for transportation to	Response timeliness Number of responses and time taken by FENZ to respond. Ambulance service data on responses and time taken to respond.

[21] Castalia Limited. (2012). *The Economic Impact of New Zealand Professional Firefighters.*

Sub-benefits	Measurement approaches	Existing measures and information sources
	hospital. This means that once the ambulance arrives, the time taken to get the patient on their way to hospital is reduced compared to what it would otherwise have been. The time difference between FENZ's arrival and that of the ambulance service is not currently measured. It would be possible to do this by comparing FENZ and ambulance service data. For example, St John records incidents attended and the time of arrival. Comparing this with FENZ data will reveal instances where FENZ was the first responder and the time difference between its arrival and that of ambulance services. Beyond measuring differences in response time, the value of a swifter response requires an assessment of impact in terms of whether the swiftness of response (by FENZ) contributed to avoiding fatalities or worsening of the patient's condition. At this stage, no easy way of measuring this impact has been identified other than to undertake a detailed assessment of incident reports and follow-up with health care providers.	
Reducing injuries	Number of injuries avoided The approach to estimating the benefits of reducing injuries is similar to that of saving lives, that is, establish the counterfactual (the number and severity of injuries that could be expected if FENZ does not attend the incident) and compare that to the actual number and severity of injuries. In the context of structure fires, one approach to this is to review incident reports where FENZ's intervention either has helped to limit the extent of injury (getting someone out of a burning structure before their injuries become severe) or avoid injuries occurring (eg by taking control of the fire scene and preventing people from entering the burning structure). In the context of major events (eg an earthquake, flood), a review of incident reports would enable assessment of the	Number of injuries avoided We are not aware of any existing data that measures the number of injuries avoided.

Sub-benefits	Measurement approaches	Existing measures and information sources
	number of situations where people were removed from danger and as a consequence, injury was either avoided or limited.	
	Social cost of injury An estimate of the monetary benefit associates with avoiding or limiting injuries can be obtained by multiplying the number of injuries avoided by the social cost ascribed to injuries.	Social cost of injury The Ministry of Transport estimates average social cost per reported serious injury at $776,000 and $77,000 per reported minor injury. These are in June 2016 prices. Updating these measures using the average hourly earnings gives: • $797,745 for the social cost of serious injuries • $79,158 for the social cost of minor injuries.
Preventing injury Reducing the risk of harm	These two types of contributing benefits, preventing injury and reducing the risk of harm, are considered together because they can both be linked to the fire prevention activity category. Preventative activities are aimed at minimising the risk of the adverse event occurring as well as minimising the unwanted consequences if the adverse event occurs. Education initiatives and regulatory interventions are important examples of fire prevention activities undertaken by FENZ.	
	Education initiatives Examples of education initiatives includes public campaigns such as "get out, stay out" and "check your smoke alarms". Two approaches to assessing the benefit of education initiatives have been identified. Both can be used – they are not mutually exclusive. The first of these is survey-based analysis. Under this approach, a survey is used to measure, in non-monetary terms, the risk and harm-reduction benefits that education	Education initiatives Change in knowledge and awareness is measured on a population basis in the Fire Knowledge and Communications Survey. Although it does not ascribe a dollar-value to the risk- and harm-reduction benefits, this survey measures the impact of FENZ's education and marketing campaigns, and can be used to demonstrate the reduction of risk in harm through education.

Sub-benefits	Measurement approaches	Existing measures and information sources
	programmes confer as a result of changing behaviours. FENZ already uses this approach and it should continue to do so. The other method for articulating the benefit of education is to undertake specific evaluation of education programmes on a case-by-case basis to understand their impacts including raising awareness levels and changing behaviours (eg installation of smoke alarms). Evaluations are already undertaken by FENZ across a range of programmes.	We understand there are specific evaluation programmes that are undertaken to assess the impact of education. A positive change in behaviour can be viewed as a proxy measure for risk-reduction benefit.
	Regulatory intervention FENZ has input into many areas of regulation. The value of the benefits which stems from this could be hard to estimate (eg because it might be difficult to attribute impact to FENZ or because the true impact of regulation may not be felt for a long time. Based on discussions with FENZ personnel, an aspect of regulatory intervention which could be readily quantified is reviews of building consents. FENZ engineers review building consents for fire risks. A quantifiable measure of the benefits can be based around the number of building consents that FENZ reviews and the number of at-risk proposals that are rejected. Calculating the latter as a proportion of total building consents and measuring the change over time can be used to demonstrate if FENZ's activities are having an impact. In addition, a sample of FENZ engineer reports could be reviewed to assess the quality of advice/feedback provided in response to consent applications.	Regulatory intervention FENZ has access to information around the number of building consents it reviews. The number of building consent interventions can be measured, including those that are passed to FENZ engineers for review and the number that are sent back for amendment.

Table 11: Reducing potential economic loss

Sub-benefits	Measurement approaches	Existing measures and information sources
Protecting and preserving property and other assets	Property damage In general, but not as a hard and fast rule, the longer it takes to respond to a fire, the greater the potential for damage to property, other assets and the physical environment. One approach to measuring benefit is the relationship between the length of time it takes FENZ to respond to a fire and the amount of damage/loss caused by the fire. The swifter the response, in general, the less is the amount of damage/loss incurred. There are estimates of structure damage per minute; for example, Challands (2010) who estimated the cost per minute stemming from structure fires to be $4,024[22]. The challenge is defining or limiting the counterfactual because in the absence of FENZ, it is not clear what the nature of the response would be (if any). An alternative approach is to assume that if there was no FENZ, then a structure fire would totally destroy the building (assumptions could be made regarding spread to other buildings). Under this approach, the benefit that stems from having FENZ is the value of the building less the cost of damage caused to the building by the fire. Capital value data relating to buildings can be obtained through various sources (eg Core Logic, Quotable Value). The cost of damage (to the structure) can be estimated by drawing on data which captures the size of area damaged and quantity survey estimates of repair or replacement cost.	Property damage Challands (2010) estimated the cost of damage to structures (caused by fire) to have a fixed component of $23,570 per fire and a variable component of $4,024 per minute for every minute of response time. The analysis was limited to responses of 15 minutes or less for the reason that responses longer than this time frame are generally caused by factors outside of the control of the fire service. The estimate was based on a study of 27,500 structure fires that occurred between 2003 and 2008. The cost of damage was based on quantity survey construction cost data. For residential buildings, an adjustment was made to arrive at a more accurate estimate of actual repair costs. The estimated cost was modelled as a linear relationship between cost and time with a boundary of response times of 15 minutes or less. The linear relationship resulted in a model fit in which response time explained only 55 per cent of the variation in property damage and associated cost arising from fire. Desirably the percentage should be higher because it means more confidence can be attached to the results of the analysis. A research question that could be explored is what other factors help to explain the variation in loss. As part of this, the research could be extended to test whether the damage per minute is truly linear (intuitively the extent and cost of damage would be expected to increase at a non-linear rate in the early stages of a fire as it begins to take hold). The research could also be extended to examine the rate of loss beyond 16 minute response time which, in so doing, could be

[22] Challands, N. (2010). *The relationship between fire service response time and fire outcomes.* Fire Technology, 46(3), 665–676.

Sub-benefits	Measurement approaches	Existing measures and information sources
	FENZ could limit the value of damage to the value of the immediate property affected or make assumptions about the extent of contagion to other properties. Instead of assuming a counterfactual of effectively no FENZ, the counterfactual could be defined as a maximum period of time before some response other than FENZ addresses the fire. The difference between the hypothetical maximum time and the actual response time could then be used to estimate the value of damage avoided using the Challands' estimate of cost per minute (or an update of that estimate).	viewed as being a better representation of a counterfactual to describe what would have happened if FENZ hadn't responded The 2010 estimate can by updated by using the Capital Goods Price Index[23]. This results in a fixed amount of $27,135 per fire and a value of $4,633 per minute in September 2017 terms.
	Damage to productive land (crops, commercial forests etc) FENZ's fire response activities help to limit damage to productive land. The approach to estimating the benefits that stem from limiting damage is essentially the same as that for property and involves determining the area of land impacted by fire and assessing the value attributed to that land.	
	Area of land impacted A counterfactual needs to be established against which to compare the actual amount of damage. This would best be described in terms of area (ie without FENZ, the area of productive land would be "X" and as a result of FENZ's intervention, the area of damage is limited to "Y" so therefore the size of area "saved" is X-Y). Defining the counterfactual will almost certainly require assumptions to be made regarding the extent of fire spread assuming a scenario of no FENZ. We are uncertain as to how assumptions could be derived but one	Area of land impacted Information regarding the area of land impacted by fire is collected. Data on the type of land would also need to be captured.

23 The Capital Goods Price Index (Infoshare reference: Capital Goods Price Index - CEP) to enable calculation of the change general level of prices of capital goods including buildings, and plant machinery and equipment. More information on the Capital Goods Price Index can be found in the Business Price Index section of Statistics New Zealand's website.

Sub-benefits	Measurement approaches	Existing measures and information sources
	option is to extrapolate from models of fire spread in uncontrolled situations. Another is to adopt hypothetical limiting assumptions: for example by assuming a geographical limit to the extent of fire spread.	
	Value of land The value of productive land needs to be established. The values would then be applied to the amount of land (by type of use) that is estimated to be "saved" as a result of FENZ's activities.	Value of land We have not found any reliable measures of the value that arises as a result of FENZ's activities in protecting productive land. There has been some research into the cost consequences of wildfires. For example, BERL reported data in relation to damage to crops and commercial forests (and, interestingly, loss in carbon credits) but their research did not link this to the impact of having a fire service (either in terms of preventing fires, or reducing their impact)[24]. That said, however, there are plenty of sources of data for the values ascribed to various types of crops, commercial forests and so on. The challenging part is to define the counterfactual and we are not aware of any existing measures or data in this respect.

[24] BERL (2009) *Economic cost of wildfires*

Sub-benefits	Measurement approaches	Existing measures and information sources
	Flow-on economic impacts FENZ could consider commissioning an Economic Impact Assessment (EIA) to understand the total economic impact of fires. Reducing the consequences of fires confers benefits on individuals and businesses. For example, fires disrupt business activity. For every dollar lost by a business suffering the fire, there will be indirect impacts on output and employment that permeate through the economy. An induced employment loss occurs as owners and employees affected by the fires lose income, and therefore reduce their consumption levels, which further reduces output and employment in the economy[25]. An EIA could estimate the value of losses and resources used in responding to emergencies. Net expenditure estimates the resources used in fire incidents. Total indirect costs represent the value of economic losses for firms supplying goods and services to the business effected by fire damage and the wider impacts on consumers and other businesses. The social costs are estimated by assigning a monetary value to the injuries that occur.	Flow-on economic impacts An economic assessment to measure the loss due to industrial fire was undertaken by BERL in New Zealand (Goodchild, Nana, & Sanderson, 2002) where they made the following observations[26]. The total impact was approximately $86 million in 2000. Direct impacts were estimated to be $67 million. The total indirect costs were estimated to $11 million. Total social costs were estimated at about $8 million. BERL note the total cost is not as large as many would expect but they also note it may reflect the impact of effective fire prevention and control.
	Traffic disruption A very specific example of economic loss raised during the workshop with FENZ and DIA personnel relates to traffic incidents. These incidents give rise to costs through disruption	Traffic disruption NZTA is a likely source of data for traffic volumes. and also has data on the effects of traffic congestion for certain parts of the

[25] Note that individual losses may be offset if lost business is picked up elsewhere.

[26] Goodchild, M., Nana, G., & Sanderson, K. (2002). *An economic assessment of industrial fire in New Zealand.*

Sub-benefits	Measurement approaches	Existing measures and information sources
	to travel times. It follows that reducing the amount of disruption confers economic benefit. FENZ is often the first responder to traffic incidents. As part of its role, FENZ clears the road of debris and undertakes traffic control both of which help to reduce traffic disruption. Measuring the benefits of this involves three steps: • identifying the length of time between time of arrival of FENZ and other agencies (eg Police) for those incidents where traffic flow is impeded (this will require data matching with other agencies including, in particular, the Police) • estimating the volume of traffic that builds up during this time (where available and relevant) and calculate the total amount of travel time delay (assuming an average occupancy rate of 1.58 people per vehicle)[27] • multiplying the length of travel time delay by estimates of the value of travel time.	road network. NZTA's Economic Evaluation Manual[28] includes estimates for the value of travel time as follows: • Urban weekday – $16.83 per hour • Urban weekend/holiday – $14.09 per hour • Urban all periods – $16.27 per hour • Rural weekday – $25.34 per hour • Rural weekend/holiday – $19.21 per hour • Rural All periods – 23.25 per hour.

27 Refer to Transport volume : Person travel at http://www.transport.govt.nz/ourwork/tmif/transport-volume/tv010/ for more information on vehicle occupancy rates.

28 NZ Transport Agency. (2016). *Economic evaluation manual.*

Table 12: Reducing damage to the environment

Sub-benefits	Measurement approaches	Existing measures and information sources
	Environmental impacts[29] There are multiple conceptual frameworks for measuring the value that society attaches to the environment (including air, water flora and fauna). At this stage, we have not identified any studies that address this in the context of fire and emergency services. One approach to measuring the impact of FENZ's activities could be to focus on land that is affected by unwanted fire and from this try to ascertain the area of land that is saved as a result of FENZ's activities.	Environmental impacts There has been some research into the cost consequences of wildfires (eg BERL reported data in relation to damage to crops, commercial forests and loss in carbon credits) but nothing which then ties this to the impact of having a fire service (either in terms of preventing fires, or reducing their impact)[30]. We understand there may also have been some research around toxic emissions from house fires but not been able to verify this.
	Measuring response to hazardous substances incidents A way to measure the benefit of containing hazardous substances in non-monetary terms is to count the number of incidents to which FENZ responds over the reporting period. This is, however, a very limited measure and it gives no real sense of benefit. A better approach would be to measure the amount and type of hazardous substances that FENZ has to deal with. Based on discussions with FENZ staff, we understand it is not pragmatic for firefighters at the emergency scene to measure the quantity of hazardous substance contained (as this would divert them from the core task of dealing with the emergency). It may be possible to estimate the quantities involved after the event, but this is not currently undertaken in the normal course of business.	Measuring response to hazardous substances incidents Data on the number of hazardous incidents responded to by FENZ each year is measured.

29 This section refers to impacts on the environment (air, water, flora and fauna as opposed to rural productive land (covered earlier).

30 BERL (2009). *Economic cost of wildfires*

Table 13: Option value

Sub-benefits	Measurement approaches	Existing measures and information sources
Public feels safer Community confidence	From an individual's point of view, fire and emergency services have value, even if they never have to be called upon. This is the option value of FENZ. The option value can be thought of as the value the public gets from feeling safer (because they know they can call on the service) and having confidence that the service is accessible 24/7. The option value is a bit analogous to an insurance policy where an individual hopes they never have to claim but they still value having the policy as reflected by the premium paid. FENZ's option value is likely to be large because there are few, if any, alternatives for individuals to call upon(ie if there is a ready alternative to using FENZ, then the option of being able to use FENZ is worth little or nothing).	A non-monetary quantifiable measure of the benefit of FENZ existing is directly related to FENZ's performance as per the SPE. A core services activity of FENZ is to provide emergency response capabilities to all New Zealand communities. The measure of success is that 90 per cent of the New Zealand population is within nine minutes drive-time from a station[31]. FENZ has geographic area coverage models showing the 5, 7, 9 and 11 minute-covered population. In this case, the measure of performance is also a measure that can describe the benefit of FENZ existing.
	Willingness to pay There are various methods for estimating willingness to pay for non-market goods and services. For example, surveys can be used to ask respondents what they would pay to have a fire station (or station that is closer to them). Alternatively, economic experiments can be used to understand preferences associated with different attributes of fire and emergency services. Both methods are feasible and both have advantages and disadvantages (eg willingness-to-pay surveys can capture the views of a large cross section of stakeholders but the results of the survey can be skewed by the way in which the survey is framed). FENZ already undertakes surveys. Accordingly,	Willingness to pay An international study (Donahue & Miller, 2006), found that in the context of public safety, an average of 46 percent of the sampled population would pay an additional US$50 per year in taxes to fund fire services as a provider of public safety[32]. Measures such as these can be estimated from survey sample data. Such methods can be incorporated into current surveys that FENZ undertakes, or can be individually commissioned as research projects.

[31] Fire and Emergency New Zealand, *2017-2018 Statement of Performance Expectations*, performance measure 7.1.1

[32] Donahue, A. K., & Miller, J. M. (2006). *Experience, attitudes, and willingness to pay for public safety*. The American Review of Public Administration, 36(4), 395–418.

Sub-benefits	Measurement approaches	Existing measures and information sources
	extending existing surveys is likely to be easier to implement than the alternative of economic experiments (but neither method is straightforward).	
	Levels of trust As an alternative to measuring willingness to pay, an option is to measure the trust and confidence that the public has in fire and emergency services to respond effectively when emergencies arise. This would involve a survey and could involve extending the scope of the existing Fire Knowledge and Communications survey.	Levels of trust There is an existing Readers Digest survey (conducted on an international basis) which surveys its readership on the trust they have in various professions. We do not have insights regarding the basis for the survey and, hence, its reliability.

Table 14: Social capital

Sub-benefits	Measurement approaches	Existing measures and information sources
Value of volunteerism to volunteers and community Community leadership, networks and coherence	PwC (2009) undertook research to understand the benefit of the volunteer fire brigade in small remote communities[33]. In this study, value was estimated using the cost to replace the volunteer, by taking the average hourly rate earned by a firefighter multiplied the number of hours worked by volunteer. This measures value based on the amount saved by not having to employ a paid firefighter. The approach taken in the 2009 study could be broadened to focus on all volunteers (ie not just those in small, remote communities) and updated using current data. Note, that in taking this approach, it is important to recognise and deduct any costs currently incurred in relation to volunteers that are not incurred in relation to paid employees (if any).	PwC (2009) estimated the cost to replace the volunteer firefighters in small remote communities (ie not all volunteers) to be $12 million. FENZ captures data relating to the number of hours contributed by volunteers. FENZ also has data on equivalent wage rates for paid firefighters. More generally Statistics NZ collects wage and salary data on a wide range of occupations. Fire Knowledge and Communications data can also be used to assess the value to society of volunteerism using existing measures. For example, the survey collects data on impressions of employment candidates if they are volunteers, which can show the positive impact volunteering has on society.

33 PwC. (2009). *Describing the value of contribution from the volunteer fire brigade.* Report prepared for the New Zealand Fire Service.

Sub-benefits	Measurement approaches	Existing measures and information sources
	The Fire Knowledge and Communications survey records some quantitative statistics around volunteerism. For example, in the July to September 2017 quarter, 82 percent of those responsible for hiring decisions would have a positive impression of an employment candidate if they were a volunteer. Non-monetary quantitative measures such as these, can be used as a proxy measure of the contribution made by FENZ to social capital.	

Table 15: Effective response

Sub-benefits	Measurement approaches	Existing measures and information sources
24/7 ability to respond Fast and simple access for consumer	The approach to measuring both of these benefits could be similar to that for measuring option value (refer to the earlier section which discusses willingness to pay). Essentially research could be commissioned to survey the willingness to pay for a 24/7 response service and the willingness to pay for fast and simple access for consumers of fire services.	We understand there are no existing measures for this benefit. Accordingly, we recommend a business process review be implemented to ensure that actual times are recorded in order to understand the nature of this benefit, and changes can be examined from a baseline year.
Effective command and control of emergency scene	We have not identified a way of measuring the benefit of effective command and control. However, having effective command and control in place sooner rather than later is clearly beneficial. Accordingly, a way to measure the timeliness with which effective command and control is established is to assume a desired target time and compare this to the actual time it takes for the command and control of the scene to be implemented.	We are not aware of any existing measures. The time taken to establish command and control at incidents can be measured with reference to the time of arrival of the appliance at the scene or at the "2nd alarm" for the commander arrival (as recorded in SMS).

Table 16: Better use of resources across emergency, medical and local government sectors

Sub-benefits	Measurement approaches	Existing measures and information sources
Reduced cost to DHBs if patients delivered within the "golden hour"	FENZ is often the first responder to emergencies where people are injured or suffering a medical emergency. FENZ personnel have skills that enable them to stabilise patients pending the arrival of ambulance services. As a result, when the ambulance arrives, it takes less time to get the patient loaded into the ambulance and on their way to hospital (or other medical assistance). Emergency services refer to the "golden hour". If patients are delivered to hospital within the "golden hour" the chances of survival are higher and risks of needing more intensive care are reduced. Ultimately, this reduces cost to the health service and society. An approach to measuring this benefit is to determine how many patients are delivered within the "golden hour" as a result of FENZ being the first responder and then overlay this with estimates of the costs saved by DHBs. As noted earlier, comparing FENZ data with ambulance service data should reveal the number of instances where FENZ is the first responder and the length of time between FENZ's response and that of the ambulance service.	A possible measure for this benefit is the average DHB cost incurred in treating injuries by severity level or severity of injury when not reaching hospital within the "golden hour". This would entail coordinating at the DHB level to understand these costs and measuring the number of patients stabilised within the golden hour. We understand no data is collected by FENZ in relation to patient injuries. This would require data sharing between FENZ and DHBs.
Territorial Authorities able to focus on core functions during emergencies	We are yet to identify any external research relating to the approach to measuring this benefit.	We are not aware of any existing measures.

Table 17: Body recovery

Sub-benefits	Measurement approaches	Existing measures and information sources
	Although responsibility lies with the New Zealand Police, FENZ undertakes body recovery activities, and the value of this can be attributed to it in this circumstance.	We understand no data is collected by FENZ relating to body recovery. This responsibility lies with the New Zealand Police. This would require data sharing between FENZ and the New

Sub-benefits	Measurement approaches	Existing measures and information sources
	The benefit of recovering a body could be measured using non-market valuation techniques, such as conducting a survey and estimating the willingness to pay to recover a body from that survey data. However, we recommend that measuring the benefits of body recovery be given a low priority (the costs of obtaining this information is likely to be significant). A sufficient measure would be to record the number of bodies recovered as a proxy for the benefits of this activity.	Zealand Police.

Table 18: Community refuge

Sub-benefits	Measurement approaches	Existing measures and information sources
	FENZ could estimate the dollar cost to house a person per day in an emergency. This is the cost saved by other agencies having to house individuals in an emergency and, hence, is a measure of the value FENZ provides.	Possible existing measures from local authorities and community organisations on temporary housing in an emergency.

Table 19: International USAR community relationships

Sub-benefits	Measurement approaches	Existing measures and information sources
Reciprocal support is efficient and fast	One of the benefits that stems from USAR, is the value that NZ obtains from the reciprocal relationship with USAR providers in other countries. This value is hard to measure as it is a matter of international diplomacy. Possibly, a measure of this value could be determined by a willingness to pay survey but we are not aware of this approach being used for this purpose. It may be possible to determine costs and savings in the provision and receipts of USAR teams to international and national incidents.	We are not aware of any existing measures.

8. Benefits - Next steps

To ensure the benefits framework takes hold within the organisation and is enduring, we recommend that FENZ should take the following actions.

Integrate the approach to benefits with work on a performance management framework

The work on benefits can usefully inform the work that is underway on a performance management framework. Accordingly, FENZ should seek to ensure that the team working on the performance management framework is fully aware of this review and seek to integrate its findings as part of their work.

Review business processes and systems

Many of the measurement approaches described in the previous section of this report rely on generating information that, potentially, can be extracted from FENZ databases but is not yet in a form that is readily accessible. Similarly, some of the approaches will require information that is not currently recorded.

There is a need, therefore, to take the findings of this review and undertake an exercise to identify where business processes (and or systems) need to be modified in order to facilitate the information that is needed for the proposed benefits measures. The scope of this is likely to include:

- data collection – continuing collection of existing data and an expanded collection of newly required data
- data collation – collation of data sources into the necessary format
- benefit quantification – calculating the value of the benefit at prescribed intervals
- performance reporting – reporting the quantified benefits in external and internal accountability documents eg SPE and Board reporting.

Assign benefit owners

Ownership for benefits measurement needs to be assigned. Ownership responsibilities are limited to measuring the benefits, rather than delivering the results as such.

More generally, in developing measures of benefit, in addition to the benefit measurement owner, there may well be others who have responsibilities in relation to benefits measures or who need to be consulted. To ensure this is fully captured, there would be advantages in developing a RACI[34] for benefits measurement.

Update some numbers

Some of the quantified benefits cited in the benefits profiles utilise data which is outdated. It would be a relatively straightforward task to undertake an updating exercise. For example, in some cases this could be as simple as contacting the agencies from which the data has been sourced to obtain up-to-date data (eg value of statistical life and the value of vehicle occupant's time).

Address areas where data gaps are greatest

Although there are several data gaps, we have identified three which are particularly significant.

- Survey data - a number of benefits hinge on what value society places on having FENZ, or aspects of the services provided by FENZ. Potentially, surveys can be used to populate measures of benefit relating to the option value and social capital benefits described earlier. Using surveys to elicit the value which individuals place on something is not, however, a straightforward task. There is a need for further consideration of where surveys may be able to assist and to develop survey methodology and approach. It is possible that existing surveys conducted by FENZ could be leveraged in this regard; for example, questions on the public's perception of benefits and their

34 RACI stands for Responsible, Accountable, Consulted and Informed. It is a framework that describes the participation by various roles in completing tasks or deliverables.

willingness to pay for a fire and emergency service could be added to the existing Fire Knowledge and Communications Survey.

- Response times - several areas of benefit, such as reducing economic loss, prevention of harm and better use of resources depend in part on response times. More work is needed to define base response times (in order to establish a counterfactual) against which actual performance can then be compared to estimate the value of FENZ's activities.
- Reducing damage to the environment - this is a relative weak spot in terms of the amount of information currently available to inform benefits in this area. Assessing the value attaching to the environment is not, however, an easy task and we would not see FENZ as being the organisation that should take the lead in trying to estimate such values. There would, however, be merit in engaging with other organisations (eg Department of Conservation and Ministry for the Environment) to ascertain whether these agencies have information which could be helpful to FENZ in measuring the benefits from reducing damage to the environment.

In addition to the foregoing, there are several contributing benefits in respect of which we have not been able (within the timeframes of this review) to develop an approach to their measurement because of the inherent complexities involved. An example of this is community leadership, networks and coherence (which is part of the social capital suite of benefits). More work is needed to define what is meant by this contributory benefit in order to begin the process of scoping how the benefit could be measured.

Build on data already collected

There are opportunities for FENZ to collect additional data on benefits where some data is already collected. An example of this is FENZ's intervention in the consent process for buildings. FENZ count how many building consents they review. If the number of building consents rejected, or requiring amendment, is also collected, this could provide a measure of impact in terms of preventing harm to New Zealanders.

Establish a next steps programme and governance

There is a lot to do. Reflecting this, it would make sense to develop a programme (including timeline) to guide work on next steps and to establish governance arrangements for providing oversight of the programme.

Concluding comment

To date, there has been very little progress in measuring the benefits stemming from FENZ's activities. Reflecting this, within the timeframe of this review we have been unable to develop quantified measures of benefit. We have however, developed approaches to measuring a suite of benefits. Collectively, these benefits will enable FENZ to articulate the value story to the New Zealand public.

More work is needed to utilise the suggested approaches and develop actual measures of benefit. As summarised above, there are some key challenges (such as defining appropriate counterfactuals) as well as key opportunities (eg leveraging existing surveys to gauge the value that society places on the provision of fire and emergency services).

Given the challenges, and time and cost involved, in measuring benefits, there is a need for FENZ to prioritise effort. Trying to make progress across all of the benefit types described in the tables above would not, in our view, be possible or sensible, because of the complexities involved and resource implications.

In general, a better approach is to target those benefits that are likely to be the most significant subject to balancing this with consideration of the degree of complexity involved and resource requirements.

FENZ will need to form its own view as to the composition of the priority benefits. Our own view, taking into account the points above, is that effort would be best directed to the following benefit types.

- Option value for the reasons that:
  - all New Zealanders benefit from having FENZ even though many never need to call on FENZ

- the majority (approximately 80 percent) of FENZ's costs relate to readiness and, accordingly, it is important to focus on the benefits associated with this aspect of FENZ's role.

- Saving lives – notwithstanding the (limited) evidence that suggests the number of lives saved might not be large, we consider that the public perception of FENZ is that this is an important part of the benefits which stem from FENZ's roles and, accordingly, the public are likely to want information on this dimension. Furthermore, saving lives is a benefit which can be linked to most if not all of the nine main activity categories.
- Protecting property and productive land – based on some of the existing data relevant to these areas, we suspect that the value of the benefits is large.
- Social capital – the contribution to communities and volunteerism are important aspects of FENZ's role but, at this stage, very little is known about the nature and scale of benefits in these areas. This is a major gap in existing knowledge.

Appendices

Appendix A – Benefits approach

Context

In scoping the range of benefits that FENZ delivers, we have had regard to FENZ's outcomes framework[35].

Work on scoping the nature of benefits and their quantification helps with assessing the value and importance attached to the achievement of outcomes and the value and size of impact that stems from the roles performed by FENZ.

We note that work was started in 2017 on developing a performance management framework for FENZ. That work (which PwC undertook as part of the FENZ transition project) also used the outcomes framework as a starting point. It was aimed at enabling FENZ to articulate the value stemming from FENZ's services and to demonstrate that those services deliver value-for-money.

The current work on benefits is, potentially, a key contribution to further work on the performance management framework and the ability to tell the value for money story.

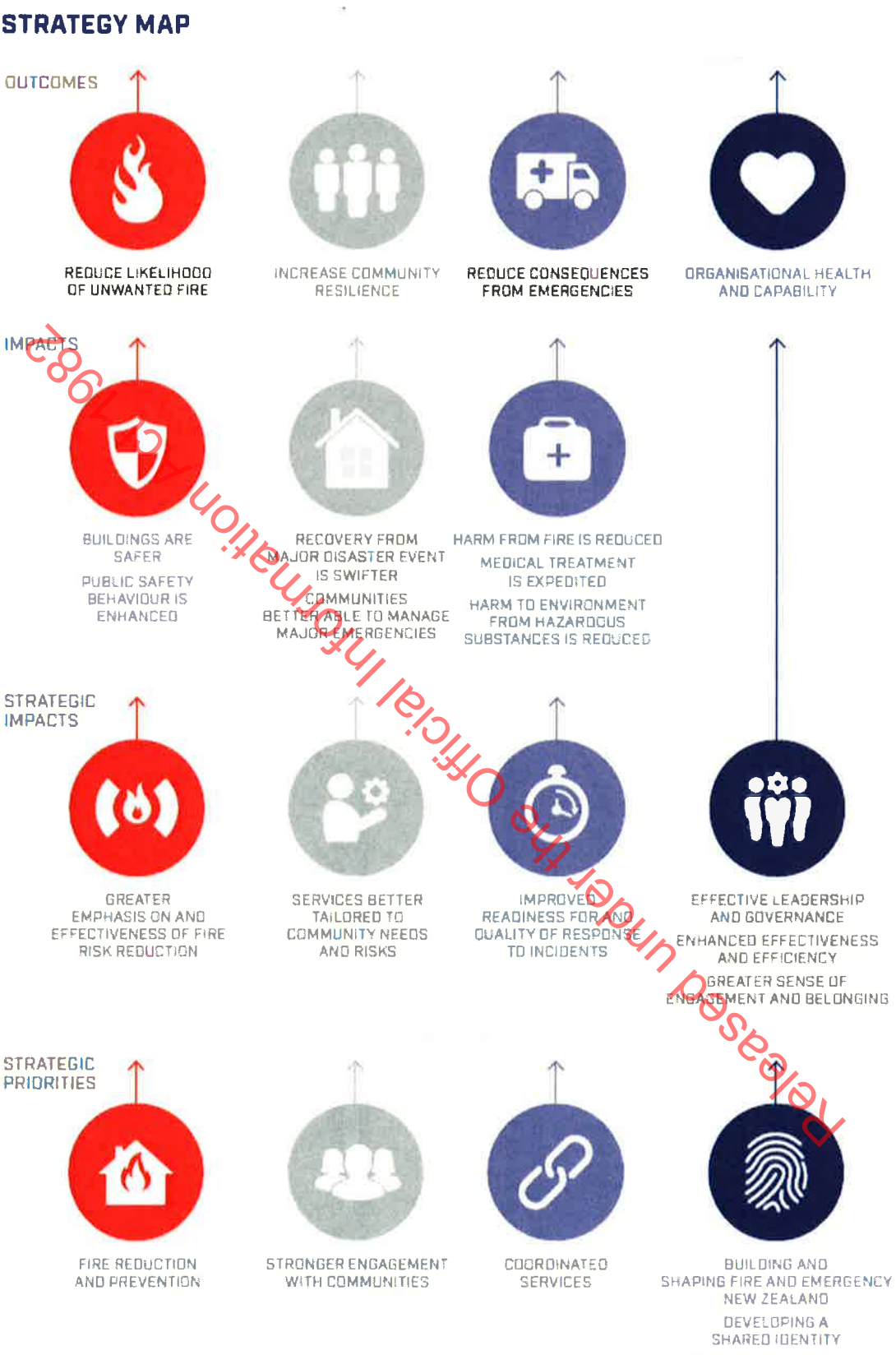
The successful management and delivery of benefits involves four stages, shown in Figure 7.

Figure 7: Stages of benefits management and delivery

This report focuses on the first stage, and parts of the second stage. It identifies the nature of the benefits stemming from FENZ's activity categories, prioritises those benefits, and makes recommendations on how the benefits can be measured and monitored (where quantified measures do not currently exist).

35 FENZ 2017-2021 Statement of Intent p13

Figure 8: Outcomes framework



Identifying and prioritising benefits

The process for identifying and then prioritising benefits has involved several steps. Taking the nine main activity categories as the foundation, we started the process by conducting interviews with a number of senior FENZ personnel to identify and scope the nature of the benefits stemming from each of the activity categories.

In parallel, PwC conducted a literature review aimed at identifying international and domestic research relevant to framing and measuring the benefits stemming from the provision of fire and emergency services. In this regard, a number of research reports commissioned previously by NZFS are relevant. Appendix B provides a list of these, and other, research reports that are of most relevance to the current review.

Information obtained from the interviews and the literature review was used to develop an initial overview of the benefits stemming from FENZ's roles. These were then mapped to the main activity categories. As part of this process, two areas of benefits were identified that did not fit neatly within the main activity categories: cross activity benefits and other benefits.

Cross activity benefits are those that are arise from multiple activity categories. A good example of this is the benefits associated with the prevention of harm. The benefits from preventing harm can be linked to most, if not all, of the nine activity categories[36].

Other benefits are those that do not flow from specific activities but are more a function of having FENZ and/or its operating model. A good example of this is the value to the community that stems from having a volunteer workforce. There are benefits from having volunteers that are independent of the specific activities performed by the volunteers.

Having identified and mapped the benefits, a workshop was held with key FENZ and DIA personnel to discuss and refine the benefits.

The output from this process is summarised in Table 20.

Table 20: Benefits identified in workshop

Cross activity:

- Life saving
- Reduced economic impact of disaster
- Community confidence
- Option value
- Community connection
- Efficient and effective response
- 24/7 ability to respond
- Fast and simple access for consumer
- Public feels safe
- Public morale supported and stress reduced
- Community coherence
- Community facility and refuge location
- Community assets
- Increased social capital through social intervention, community leadership, building community networks
- Employer and employee gains through increased skills
- Wider risk reduction

Fire response:

- Preserves value of property
- Protects assets
- Reduces damage to environment

Motor vehicle:

- Prevents subsequent injury to other road users
- Reduces cost of road maintenance as roads are cleaned

Medical response

- Better use of resources across sector
- Reduced cost to DHBs as patients stabilised within 'golden hour'

Other response

- Damage is limited

Hazardous substances

- Helps environment and reduces long

Severe weather

- People get back on their feet faster

[36] We note that the existence of cross-activity benefits does not invalidate the activity categories within the ABC model, Rather, it simply illustrates the fact that there are many to many relationships between activities and the benefits they give rise to.

term environmental exposure • Supports prevention through location knowledge	• Frees up TAs to focus on core functions • Reduces injury to population • Utility providers are able to repair and replace more quickly • Reduces property and infrastructure damage
USAR	*Fire prevention*
• Recovers bodies • Relieves local emergency response • Provides government confidence • Relationship with international USAR community	• Increases visibility of FENZ to the public • Increases public safety • Prevents loss of economic and financial good
Education	
• Protects people and assets • Public is safer • Increases resilience	

Many of the benefits identified in the workshop are similar, or the same, in nature and many of them also apply across multiple activity categories. Moreover, some of the benefits are contributors to other benefits. For example, protecting and preserving property, assets and environment are benefits that contribute to the more general benefit of reducing potential economic loss. Similarly, preventing damage and supporting faster recovery also contribute to the wider benefit of reducing potential economic loss. In benefit management literature, the contributory benefits are referred to as immediate benefits and the benefit of reducing potential economic loss is referred to as an end benefit.

Taking these points into account, and consistent with best practice for benefits management which recommends that organisations should focus on a small number of core benefits for optimal benefits management and delivery, the long list of benefits in Table 20 has been refined into a shorter list of "end" and "contributing" benefits. This is shown in Table 21.

Table 21: Benefits and contributing benefits

End benefits	Contributing benefits
Prevention of harm	• Saving lives • Preventing injury • Reducing risk of harm
Reducing potential economic loss	• Protecting and preserving property, assets and environment • Preventing damage • Reducing risks of damage • Supporting faster recovery
Reducing damage to the environment	• Reducing environmental impacts • Limiting impact of hazardous substance spills
Option value	• Public feels safer • Community confidence • Government confidence
Social capital	• Value of volunteerism to volunteers and community • Community leadership, networks and coherence
Effective response	• 24/7 ability to respond • Fast and simple access for consumer • Effective command and control of emergency scene
Better use of resources across emergency, health and local government sectors	• Reduced costs to DHBs as patients stabilised within 'golden hour' • TAs able to focus on core functions during emergencies
Body recovery	
International USAR community relationships (reciprocal support is efficient and fast)	

Finally, the identified benefits were prioritised using a range of criteria as summarised below:

- relevance to the FENZ Act and core role
- relevance to the current emergency environment
- frequency of delivery
- scale/importance of delivery.

Workshop participants were asked to consider each benefits and prioritise them in light of the criteria listed above. This process resulted in benefits being assigned as either a core priority benefit or a supporting priority benefit.

In summary, the process followed has provided a focused list of benefits that lie at the heart of being able to articulate the benefits stemming from the roles performed by FENZ. These are summarised in Table 22.

Table 22: Prioritised benefits

Core Priority Benefits:
• Prevention of harm (saving lives, preventing injury, reducing risk of harm)

- Reducing potential economic loss (protecting and preserving property, assets and environment, preventing damage, reducing risks of damage, supporting faster recovery)
- Reducing damage to the environment
- Option value (public feels safer, community confidence, government confidence)
- Social capital (value of volunteerism to volunteers and community, community leadership, networks and coherence)

Supporting Benefits:

- Effective response (24/7 ability to respond, fast and simple access for consumer, effective command and control of emergency scene)
- Better use of resources across emergency, medical and local government sectors (reduced cost to DHBs as patients stabilised in golden hour, TAs able to focus on core functions during emergencies)
- Body recovery
- Community facility and refuge location
- International USAR community relationships (reciprocal support is efficient and fast)

Measuring the benefits

Having confirmed the core list of prioritised benefits, the next stage of benefits management and delivery is to develop benefits realisation plans (ie plans which set out who owns the benefits, how they are going to be measured and the timeframes for their measurement). In order to do this, there is a need to establish a baseline measure for each benefit.

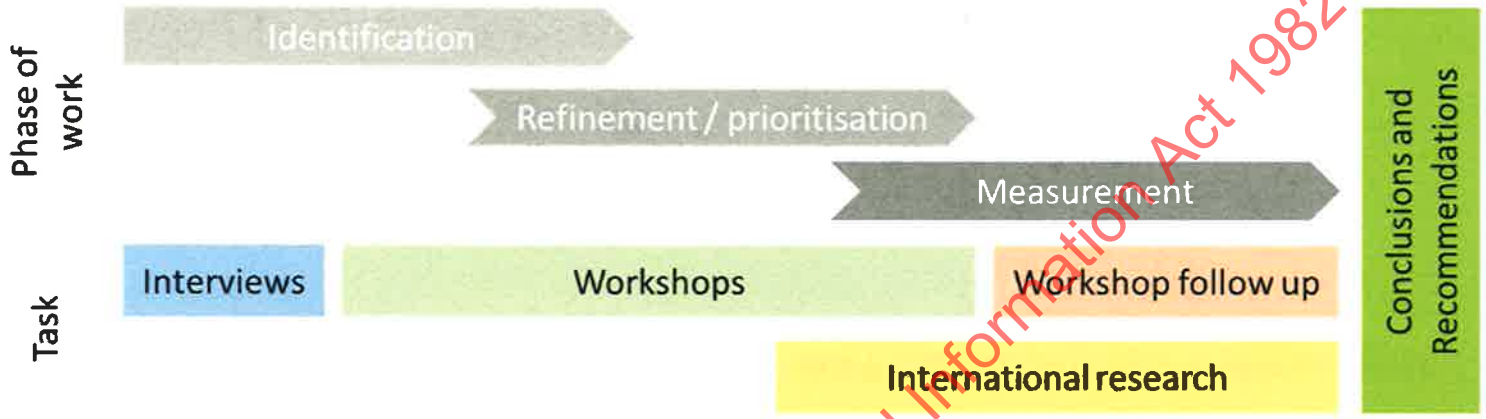
To this end, workshop participants were asked to identify where measures already exist for priority benefits.

With respect to those benefits (which are in the majority) for which measures do not currently exist, workshop participants were asked to consider if the benefit could be measured, and if so how. Participants were also asked to indicate the degree of difficulty anticipated in being able to develop a measure (for example, because of data limitations or conceptual challenges in developing an approach to measurement, or the cost of measurement being high).

Following the workshops, we have engaged with FENZ personnel who have good understanding of the data collected by FENZ and familiarity with the approaches to, and challenges involved in, benefits measurement.

Discussions with these personnel, together with reference to relevant international and domestic research, has contributed to the development of initial measurement plans for each priority benefit. Figure 9 summarises the tasks undertaken at each phase of work described above. The measurement plans are described in Section 7 of this report (and form the key deliverable for this part of the terms of reference).

Figure 9: Approach to Benefits Framework



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Appendix C – Restrictions

This report has been prepared solely for the purposes stated herein and should not be relied upon for any other purpose. We accept no liability to any party should it be used for any purpose other than that for which it was prepared.

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The statements and opinions expressed in this report are based on information available as at the date of the report.

We reserve the right, but will be under no obligation, to review or amend our report, if any additional information, which was in existence on the date of this report was not brought to our attention, or subsequently comes to light.

This report is issued pursuant to the terms and conditions set out in the terms of reference dated 24 August 2017.