



Institute of Environmental Science and Research  
Protecting and enhancing the nation's health and well-being through science  
*Manaaki tangata taiao hoki*

# Statement of Corporate Intent 2012 – 2017





# Human health



Protecting and enhancing the nation's health  
and well-being through science

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# Forensic science

Protecting and enhancing the nation's health  
and well-being through science

# Executive Summary

The coming few years will mark an important evolution in the Institute of Environmental Science and Research's (ESR's) strategy. This Statement of Corporate Intent sets out our intended direction and areas of focus.

We are the lead Crown Research Institute providing specialist services focused on forensics and infectious diseases that impact on human health. We have a unique role in protecting and defending New Zealand by providing specialist scientific and research services, based on our expert capabilities and national science assets.

The Government has a goal of doubling the value of science to New Zealand. The contribution of New Zealand's science and innovation system will be vital to lifting productivity. Alongside all other parts of the science and innovation system, we will play our part in achieving this goal.

To do this, we will be expanding our traditional focus, from providing scientific testing services to supporting science-based innovation in the sectors where we have core capabilities. This means we need to better understand and align our work with the science-based needs of New Zealand industry, government regulators and other users of research.

ESR is clear about the need to ensure that the knowledge and technology innovation achieved by ESR in collaboration with its partners is transferred for the benefit of the sectors in which we work, and for wider New Zealand. Throughout this document we have highlighted a shift towards a more outward-focused approach to how Crown-funded research is undertaken, driven by clear sector issues and with sector support. Our revised core funding allocation framework will support focused sector partnerships that enable the transfer of knowledge and technology.

Our intentions are:

- to keep advancing in our core business to offer the best, and most efficient, science-based testing services for our clients in our core areas of focus
- to use our significant national assets and capabilities to deliver new value-adding services in the areas of justice and security (e.g. using the DNA Profile Databank), health and disease (e.g. personalised medicine) and food safety and integrity (e.g. using unique capabilities in bio-control products and radiation science)
- to use our unique capabilities in bio-control products and diagnostic tools to help New Zealand food companies to maintain and gain international market access.

As part of repositioning ESR our range of clients will broaden, and is likely to include government and private sector organisations that carry out manufacturing, service provision, regulation and monitoring. We will also be strengthening engagement with our key sectors through strong partnerships, and our core funding allocation framework has been revised to reflect this.

# ESR's Purpose and Roles

## Our organisation

The Institute of Environmental Science and Research (ESR) is a Crown Research Institute (CRI). It was incorporated in July 1992 and is wholly owned by the New Zealand Government. The two shareholding Ministers appoint a Board of Directors to govern the organisation. ESR has scientific facilities in Auckland, Wellington (Porirua and Wallaceville) and Christchurch.

## Our purpose and goals

Our purpose is to protect and enhance the nation's health and well-being through working to address challenges that require science-based innovations in health and disease, justice and security, food safety and integrity, and environmental health and hazards.

Our independent scientific advice and services help our clients to deliver better evidence-based policy, and better operational outcomes. The specific outcomes and impacts we are seeking to achieve are set out in our Statement of Core Purpose and discussed throughout this document. Our full Statement of Core Purpose is set out in Appendix 1.

## Our roles and activities in the science and innovation system

ESR provides a range of research- and science-based services to different clients. In the future we aim to broaden our role and impact in the science and innovation system – from primarily being a provider of specialist scientific services to government to being an enabler of science-based innovation in the sectors where we have core capabilities.

### OUR UNIQUE CAPABILITIES DEFINE WHERE WE CAN ADD VALUE

Our strategy for the future needs to build on the unique capabilities and resources that are embodied in our people, knowledge, systems and facilities. Over time, we have built and maintained leading-edge (national and international) capabilities in infectious diseases and forensic science and science-based services. Our value in these areas is underpinned by a range of national science assets and facilities that are critical for New Zealand. These include the:

- National Radiation Laboratory (NRL)
- National Centre for Biosecurity and Infectious Disease
- National Influenza, Polio and SARS Centre
- DNA Profile Databank
- National Vaccine Services
- New Zealand Reference Culture Collection (Medical section).

Our capabilities enable us to be an authoritative advisor on critical national reference science in health and forensics. We have a unique role in protecting and defending New Zealand in the following areas:

### JUSTICE, DEFENCE AND COMMUNITY SAFETY

We aim to increase the effectiveness of forensic science services applied to safety, security and justice investigations and processes. ESR plays a lead role as the sole provider of forensic services to the New Zealand Police. Our services contribute to more effective justice sector operations and judicial outcomes, and more efficient justice sector processes. ESR has developed unique capabilities not found anywhere else in New Zealand that provide our justice sector partners with a highly cost-effective and efficient forensics service. Our expertise is also recognised worldwide, resulting in many requests to share information with our 'NZ Inc' partners.

### HEALTH AND DISEASE RISK AND PROTECTION

We aim to safeguard the health of New Zealanders through improvements in the management of human biosecurity and threats to public health. We work with others to identify and manage public health threats from diseases and the environment, and in doing so we contribute to a reduction in harm from illness, reduced health sector costs, increased human productivity and a safer, more productive use of water resources. Our work includes:

- the surveillance of human pathogens and zoonotic diseases
- advice on the impacts of the environment on human health, including radiation, groundwater, freshwater and drinking-water quality and safe biowaste use.

We are the principal science advisor to the Ministry of Health. ESR undertakes many activities that underpin and inform government responses and decision- and policy-making. We have a range of unique capabilities, including our role in providing nationally coordinated investigations of any outbreak on behalf of the Ministry of Health through:

- our internationally benchmarked peak biological laboratory for microbiological reference lab testing e.g. phage typing for *Salmonella*
- managing the national notifiable diseases database and the associated surveillance system. Our long-term experience and knowledge enables us to provide high-quality advice on notifiable disease outbreaks effectively and efficiently
- early notification as part of our surveillance role via an established electronic direct lab notification system that allows quick and accurate information flow and notifications from our public health sector partners.

## FOOD SAFETY AND INTEGRITY

We aim to protect the integrity of New Zealand's economy, and grow New Zealand's competitive advantage in overseas markets, by contributing to the better management of issues in domestic and export food production systems; and helping to maintain access to key export markets, in partnership with the Ministry for Primary Industries and New Zealand food manufacturers, processors and distributors.

## Who we work with and how we work

We work with a range of clients in central and local government, industry organisations and the private sector, with the majority of our current work supporting government agencies to improve their services and operations. We work in partnership with our government clients to ensure that the science they purchase is meeting their needs and addressing the Government's priorities.

We operate a project-based business model, which enables us to bring together the best team to tackle any given task we undertake, be it research, stakeholder engagement, service delivery or evidence for policy. We lead and participate in teams drawn from across ESR, and from external collaborator and stakeholder organisations in New Zealand and overseas.

## VISION MĀTAURANGA

ESR has a proud reputation for engagement and collaboration with Māori, particularly on health- and water-related research projects with strong social science dimensions. ESR will continue to incorporate Vision Mātauranga concepts into research and operational activities in environmental health and forensic science. For example, all forensic scientists attending crime scenes receive tikanga Māori training to assist them to do their jobs while being fully aware of cultural sensitivities and the needs of whānau under difficult circumstances. ESR will place more emphasis in future on assisting iwi/Māori corporations in their commercial endeavours as well as on health improvement projects and support for local iwi to increase their science capacity and capabilities.

A key initiative in which ESR is partnering with Māori is the Biowastes programme, which aims to better understand the human and environmental risks and benefits that can arise from applying biowastes to land, particularly sewage treatment plant biosolids. The multi-organisational and multi-disciplinary team of researchers has partnered with Māori organisations at two case study sites (Te Rūnanga o Kaikōura, Kaikōura and Whenuabiz, Mokai, Taupō) to explore the application of biosolids to land as a sustainable option for New Zealand. Fundamental to the Biowastes programme is the involvement of communities to explore important social, cultural and economic considerations in tandem with the emerging scientific environmental knowledge. The research team endeavours to better understand how reuse decisions are considered and debated by tangata whenua and communities and how they can become familiar with the reasoning behind waste management decision-making.



Photo courtesy The Marlborough Express

# Strategic Context and Direction

## Operating environment

This section briefly describes general elements of ESR's operating environment that present challenges or opportunities that ESR's strategy needs to consider. Aspects of the operating environment that are specific to each of ESR's four outcome areas are discussed in the section on focus and activities.

### **TIGHTER FISCAL ENVIRONMENT IN GOVERNMENT**

Pressure on government agency baselines affects our key government clients as they seek to manage costs while delivering Better Public Services. This pressure presents both a challenge and an opportunity for ESR. On one hand, we need to ensure that we are providing services that are value for money, at a time when pressure on agencies to realise savings has the potential to impact on our revenue streams. On the other hand, there are opportunities for ESR to develop and provide science-based innovations and services that help to manage the increasing pressure on government resources in key sectors. For example, our work in the environmental and health areas helps in managing escalating costs in the health sector by enabling the earlier detection and management of disease outbreaks and by putting our science closer to the sources of the problems. Similarly, there are opportunities for innovative forensic services to reduce the time (and costs) associated with aspects of investigative and court processes.

### **A CHALLENGING COMPETITIVE ENVIRONMENT**

Over time, we are seeing increased competition in some areas of our core business, such as drug testing. Our intended strategy aims to address the revenue risks this presents by keeping us at the forefront of innovation (with the right investments in capability to back this up) and by broadening our client base to avoid heavy reliance on a few key contracts.

### **'NZ INC' IMPERATIVES IN THE NATIONAL SCIENCE AND INNOVATION SYSTEM**

The Government expects all players in the national science and innovation system to work in a more integrated way so that this system delivers better value to New Zealand. In a small country with constrained expertise and capital, we need to maximise the returns from science and innovation investment as a whole – in essence, 'the whole needs to be greater than the sum of the parts'.

In practice, this requires the different parts of the system, which includes ESR, to understand and leverage their complementary strengths more collaboratively to support innovation in key social and economic sectors. There is a range of key areas where we will be working with others across the science and innovation system, and partnering

more actively with firms that are looking to develop and exploit commercial opportunities. We will increasingly be looking outwards to understand and respond to the needs of our key sectors, then supporting and partnering with them to deliver innovative services and products. Changes in our framework for allocating core funding will be made to reflect this imperative and the need for a more strategic 'top-down' view of priorities.

### **SOME OF OUR INFRASTRUCTURE REQUIRES INVESTMENT**

We need to update and refresh some of our science infrastructure and supporting infrastructure to support the new strategic direction we intend to pursue. We need to invest in our infrastructure (including facilities, information management, equipment and property) in a way that will enable us to provide more value to our clients and fit us better for the future, as well as reduce our long-term operating costs.

## Strategic direction

### **WE ARE DEVELOPING A NEW STRATEGY**

ESR is revising its strategic direction to respond to new challenges and opportunities. We will be focusing our attention on addressing challenges in New Zealand that require science-based innovation in our areas of focus. By developing and supporting innovation in these specific areas, we will aim to help our clients to solve today's problems and assist them to avoid future catastrophes, and contribute to improved sector performance and productivity.

### **REPOSITIONING ESR – FROM SCIENTIFIC TESTING TO SCIENCE-BASED INNOVATION**

For a long time we have seen our primary role in the science and innovation system as providing unique, specialist scientific and research services to government agencies, based on our expert capabilities and national science assets in forensic science and infectious diseases.

In the future we will build on these services, using leading-edge science to improve results for our clients. But to support the Government's goal of doubling the value of science to New Zealand, we recognise that we need to broaden our focus from providing scientific testing services to supporting science-based innovation. To do this we need to better align our work with the science-based needs of New Zealand industry, government regulators and other users of research.

## ELEMENTS OF OUR FUTURE STRATEGY

Key elements of our intended strategy are:

- to keep advancing in our core business to offer the best, and most efficient, science-based testing services for our clients in our core areas of focus. We envisage our growth in the 2012/13 financial year to come largely from this and other core business activities
- to leverage our significant national assets and capabilities to deliver new value-adding services in the areas of justice and security (e.g. using the DNA Profile Databank), health and disease (e.g. personalised medicine) and food safety and integrity (e.g. using our unique capabilities in bio-control products and radiation science). We expect that our long-term growth will come from these initiatives and will start to impact from the 2013/14 financial year
- to contribute to growth in export earnings from innovation for New Zealand firms that are operating in our key sectors, and continue to ensure that New Zealand products clear the barriers for entry to overseas markets. As part of this shift, we expect that our range of clients will broaden, and is likely to include government and private sector organisations that carry out manufacturing, service provision, regulation and monitoring. We will strengthen sector capabilities through strong partnerships and strategic acquisitions.

## SUPPORTING STRONGER SECTOR-BASED INNOVATION

The Government is clear about the need for strong knowledge transfer from its CRIs. We will aim to grow partnerships with existing and new clients in our areas of focus to help them to solve their sector challenges. To support this, more than 40% of our core funding in future will be directed towards work that relates to the challenges and opportunities currently facing the sectors in which ESR operates. Projects will be outwardly focused, driven by clear sector issues and with sector support. The aim will be to use the funding from this part of the funding portfolio to leverage sector co-funding, helping to drive a partnership approach to developing solutions jointly.

If ESR is to make a substantial difference to its key sectors, merely increasing the amount of knowledge generated will not achieve that goal. ESR will ultimately be research led but we will need to ensure that intellectual capital in all its forms is more efficiently and effectively transferred to sector users.

## WORKING WITH OTHER SCIENCE AND INNOVATION PROVIDERS TO ACHIEVE BETTER RESULTS FOR 'NZ INC'

Collaboration with other parts of the science and innovation system is important for us to contribute to addressing

national challenges and opportunities. In many of the sectors in which we work (such as the food production sector), the reality is that there are multiple, complementary sources of expertise. This means that best value will be delivered to clients by multilateral partnerships with fellow CRIs, universities, local authorities, health authorities, consulting firms and others. We will actively seek to build collaborative arrangements where these are needed to deliver better results for clients in different sectors. Our partnerships in our key areas of focus are described in later sections of this document.

## INTERNATIONAL CONNECTIONS

ESR places a high priority on using international relationships and collaboration to achieve our purpose. Highlights include:

- ESR leads international research in blood pattern and forensic mRNA research, with core funding augmented by National Institute of Justice (United States) funding
- ESR environmental health scientists participate in multiple European Union-funded projects, particularly in food safety, where we offer unique expertise now being leveraged into China
- ESR forensic products and services continue to be targeted to Australia, North America, Asia and the Middle East
- ESR is assisting the Ministry of Foreign Affairs and Trade with bilateral relationships with Australia and Asian countries and the Pacific
- ESR, through the NRL, provides international monitoring and support activities under the terms of the Comprehensive Nuclear-Test-Ban Treaty
- ESR is leading a multi-million dollar (US\$) research project funded by the US Centers for Disease Control and Prevention on influenza surveillance in New Zealand, working with public health, clinical and academic collaborators to perform 'flu surveillance, which will inform the US public health response
- ESR contributes to the work of the Pacific Public Health Surveillance Network, the World Health Organization (WHO) and the South Pacific Commission in the Pacific
- ESR scientists are members of and advisors to many international and global organisations (such as PulseNet and WHO's Global Outbreak Alert and Response Network) and collaborate actively with the US Centers for Disease Control and Prevention, the WHO Collaborating Centres for influenza, the European Centre for Disease Prevention and Control, the Health Protection Agency in the United Kingdom, and the Institut Pasteur.

## ESR's outcome areas

Reflecting our Statement of Core Purpose and our underlying areas of capability, we focus on contributing to four important outcome areas for New Zealand. Our outcomes are listed below.

### OUR OUTCOMES

**OUTCOME 1: Safeguard the health of New Zealanders through improvements in the management of human biosecurity and threats to public health**

**OUTCOME 2: Increase effectiveness of forensic science services applied to safety, security and justice investigations and processes**

**OUTCOME 3: Enhance protection of New Zealand's food-based economy through the management of food safety risks associated with traded goods**

**OUTCOME 4: Improve the safety of freshwater and groundwater resources for human use and the safer use of biowastes**

# Focus and Activities

This section sets out further detail on the outcomes we are seeking to achieve, the focus of our efforts, and the measures we will use to assess our performance in each area.

## Outcome 1: Safeguard the health of New Zealanders through improvements in the management of human biosecurity and threats to public health

*ESR Health will expand its focus to a whole-of-health-system burden of infectious diseases by leveraging its experience and capabilities in notifiable infectious diseases.*

### WHAT DO WE SEEK TO ACHIEVE?

The economic cost of human disease is very high as a result of lost productivity, direct costs to the health and social welfare systems, and the financial and social costs to individuals, families and communities. Our work under this outcome area contributes to a reduction in the harm and costs from disease and other environmental risks, by providing services that support government and the health sector to minimise the impacts of microbiological, electromagnetic and other environmental hazards on public health.

Issues and pressures that present challenges in this outcome area include:

- key public sector clients managing reduced funding baselines
- ever-increasing demand for health services
- pressure to control sector costs
- the ongoing risks of pandemics and other outbreaks of infectious diseases
- emerging obesity and diabetes epidemics
- the aging demographics of New Zealand and the impact this will have on health service demands and costs
- the impacts and costs of rapidly changing technologies
- increasing ethnic diversity
- Māori and Pacific peoples, the young and the old, suffering ill health disproportionately.

Our work provides innovative science, robust research and high-quality information and analysis to address these and other challenges. The main direct impacts of our work are:

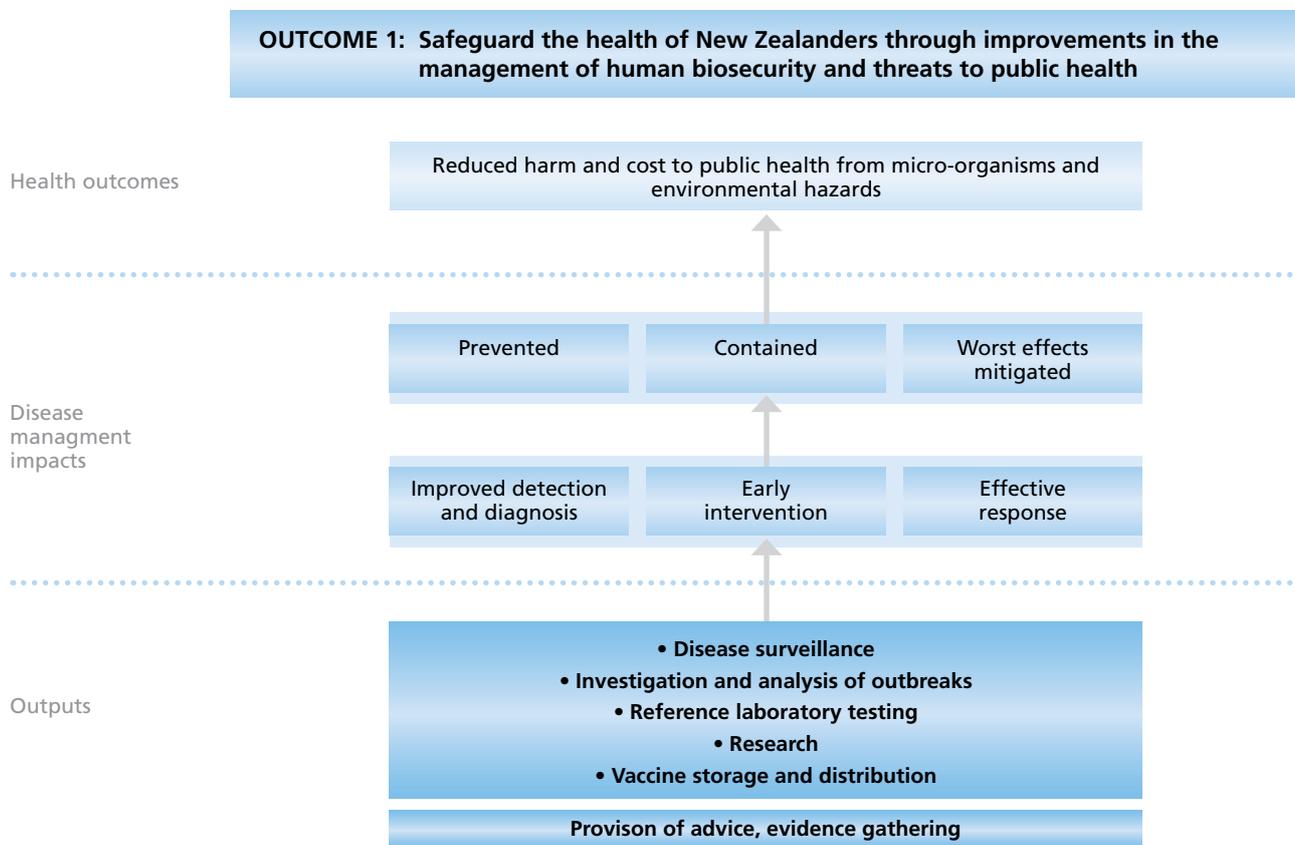
- **the early detection of public health hazards and disease outbreaks.** Time is of the essence in managing threats to public health; the early detection of risks and outbreaks enables early intervention. With early detection based on the accurate and timely identification

of infectious disease events, hazards and diseases can sometimes be prevented altogether. Once there is an imminent threat to public health, the sooner that authorities can intervene, the easier it is to minimise the spread of disease and the consequential impacts on public health. Our work contributes to early detection directly through health intelligence, surveillance, analysis and reference laboratory services

- **the application of effective interventions to manage risk and the incidence of public health hazards and diseases.** Managing the risk and incidence of hazards and diseases can only be effective if the right interventions are applied (at the right time). Our work helps public health organisations to manage and improve responses to public health problems effectively. This includes providing research as an evidence base for policy and operational improvement, and effective management of the national vaccine supply.

In the future, we will look to provide a wider range of services and innovative support to a wider range of clients. We will increasingly aim to work with New Zealand health process, system, treatment and technology sector companies and providers to innovate smarter systems and technologies, with the aim of improving operational efficiency and effectiveness and, where feasible, supporting growth in export earnings.

**FIGURE 1: RATIONALE FOR OUR PUBLIC HEALTH OUTPUTS**



**WHAT WILL WE DO TO ACHIEVE THIS?**

ESR undertakes many activities that underpin and inform rapid and effective responses to public health risks and problems. These include:

- *microbiological reference laboratory testing* (including the National Influenza Centre and Virology Reference Laboratory, SARS Laboratory, Polio Laboratory, Enteric Reference Laboratory, Nosocomial Infection Laboratory, Invasive Pathogens Laboratory, Legionella Laboratory, Bloodborne Virus Laboratory, Norovirus Reference Laboratory, Leptospira Laboratory and Anti-microbial Resistance Laboratory)
- *surveillance and analysis:*
  - the operation of EpiSurv, the New Zealand notifiable disease surveillance system
  - the identification of aberrant patterns of infectious disease
  - the microbiological and epidemiological investigation and analysis of infectious disease outbreaks
  - the coordination of national outbreak investigations on behalf of the Ministry of Health

- *the maintenance and development of the New Zealand Reference Culture Collection* of medically significant bacteria
- *the storage and distribution of vaccines*, the forecasting of vaccine requirements (including recommendations on the composition of seasonal influenza vaccines) and the oversight of tendering processes for the provision of vaccines to the Ministry of Health
- *research* into infectious diseases, public health events, climate change and social systems to improve health service delivery
- *NRL testing* of environmental radioactivity samples and global monitoring of atmospheric radioactivity data collected from stations around the world as part of New Zealand’s contribution to the Comprehensive Nuclear-Test-Ban Treaty.

ESR operates and provides services to central government under negotiated and agreed contracts with the key government health and biosecurity agencies. These contracts enable us to deliver core health science services at local and community levels to district health boards (DHBs) and local government. An important aspect of the infectious

disease science we perform on behalf of the Ministry of Health is that it enables New Zealand to meet International Health Regulations requirements.

Our partnerships are currently centred on the public health units, the Health Research Council and the US Centers for Disease Control and Prevention. In future we will look to extend our partnerships to include DHB planning and funding units, the primary care sector and provider partners.

### WHAT ARE OUR KEY INITIATIVES?

Key initiatives in the coming year include:

- broadening ESR's sphere of influence in both the epidemiological analysis of non-notifiable infectious diseases and decision support for DHBs. We will expand from the surveillance of notifiable infectious diseases to the surveillance and analysis of those infectious diseases that create a social, system and financial burden, such as pneumonia and other respiratory infections and cellulitis
- building on the recent success in establishing SHIVERS (the Southern Hemisphere Influenza and Vaccine Effectiveness Research and Surveillance Project). This initiative to commission a Southern Hemisphere 'flu laboratory was enabled by ESR and collaborators winning funding from the US Centers for Disease Control and Prevention in an internationally contestable process. There is an opportunity for us to build on this major international research success to position New Zealand well as an international centre for similar research. This would involve promoting a more collaborative 'NZ Inc' approach with partners that include DHB laboratories, clinicians, hospitals and reference science providers
- implementing a new laboratory information management system (LIMS). This major investment will help us to provide a better, faster public health information service. This initiative is described in more detail in the section on ESR's capability, as it is infrastructure that helps us to improve a range of our services
- establishing baseline measures for all health performance measures as a means to monitor ESR's relative performance in the next five years.

We will engage with potential new clients to understand how we might be able to meet their needs through science-based innovation. They include private sector health providers and insurers, DHBs, pharmaceutical companies, medical professionals and water treatment providers.

**THE SHIVERS PROJECT**  
SOUTHERN HEMISPHERE INFLUENZA AND VACCINE EFFECTIVENESS RESEARCH & SURVEILLANCE

INFLUENZA IS A RESPIRATORY ILLNESS CAUSED BY A RANGE OF FLU VIRUSES

**THE GLOBAL IMPACT OF THE FLU**

THE INCREASE IN GLOBAL TRAVEL MEANS EVERY YEAR FLU TRAVELS AROUND THE WORLD, FOLLOWING THE WINTER SEASON, ALL THE WHILE MUTATING AS IT GOES. SO BY THE TIME IT COMES BACK SOUTH FOR THE NEXT WINTER IT'S OFTEN IN THE FORM OF AN ENTIRELY NEW STRAIN, RESISTANT TO LAST YEAR'S TREATMENT.

**THE BIG ONES**  
The H1N1 Swine Flu outbreak over the last two years highlighted the fact that we never know when the next big pandemic may strike. In the last century alone tens of millions have died in major outbreaks.

**1918 H1N1 THE SPANISH FLU**  
Like our recent Swine Flu also an H1N1 strain, the 1918 flu is thought to have been one of the most deadly pandemics in human history killing up to **100 MILLION** PEOPLE WORLDWIDE

**1957 H2N2 THE ASIAN FLU**  
**2 MILLION** PEOPLE WORLDWIDE

**1969 H3N2 THE HONG KONG FLU**  
**1 MILLION** PEOPLE WORLDWIDE

**2009 H1N1 THE SWINE FLU**  
Through either luck or good management the 'swine flu' virus killed around **20,000** PEOPLE WORLDWIDE being less than half the deaths caused in a normal flu season in the US alone. But it's undesirable to let our guard down, as the next big pandemic may be lurking around the corner. For example, a recent new strain of the **2003 H5N1 BIRD FLU** which is resistant to most antiviral drugs and 60% OF THOSE INFECTED

**THE ANNUAL BURDEN OF FLU IN NEW ZEALAND**

IN NEW ZEALAND UP TO **780,000** PEOPLE GET INFECTED WITH FLU  
UP TO **480,000** PEOPLE GET SICK WITH FLU  
UP TO **1500** PEOPLE HOSPITALISED WITH FLU  
UP TO **49** DIE AS A RESULT OF THE FLU

**THE SHIVERS PROJECT**  
SOUTHERN HEMISPHERE INFLUENZA VACCINE EFFECTIVENESS, RESEARCH & SURVEILLANCE

A CDC five-year, multi-million dollar contract to study influenza in an effort to better understand the burden of the virus and how to prevent its spread around the world

**WHY NEW ZEALAND IS PERFECT**

**SCIENTIFIC EXCELLENCE**  
The NZ response to the H1N1 2009 Swine Flu was internationally recognised as 'best in class'. To make SHIVERS a reality ESR has collaborated with ACIERS, CMCRI, the Universities of Auckland and Otago, and St John's to assemble a highly collaborative multi-disciplinary multi-centre scientific team in NZ and abroad!

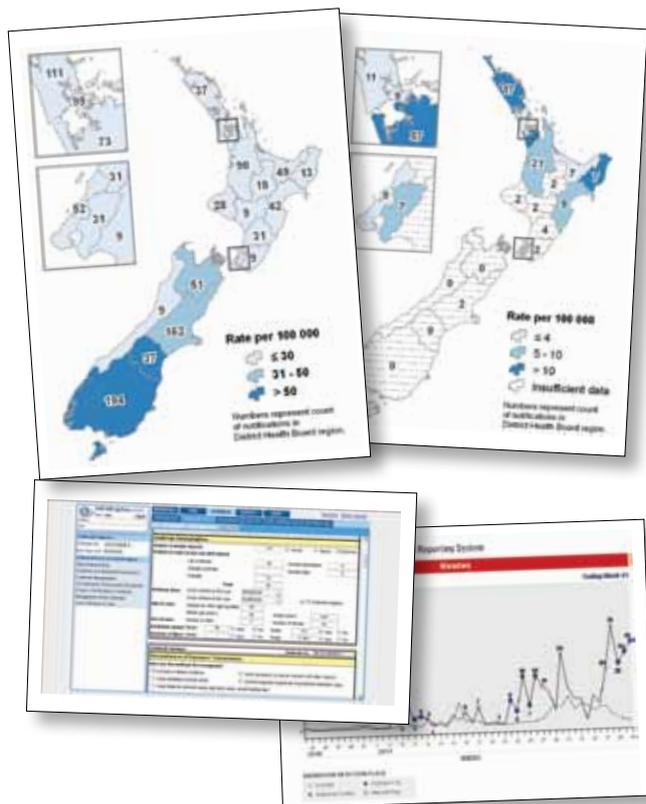
**OUR HEALTH SYSTEM**  
Our highly computerised health system, from the local GP through to the hospital and lab, in which every patient has a unique and trackable NZ number means we are a great source of quality data.

**LOCATION**  
New Zealand already has a highly effective National Influenza Surveillance System in place providing real time strategic data to the Northern Hemisphere. This programme will be effect extend the existing system by establishing two new surveillance systems – one Auckland – one hospital based and one Community based.

**NATIONAL INFLUENZA SURVEILLANCE SYSTEM**  
New Zealand already has a highly effective National Influenza Surveillance System in place providing real time strategic data to the Northern Hemisphere. This programme will be effect extend the existing system by establishing two new surveillance systems – one Auckland – one hospital based and one Community based.

**ESR**  
The Institute of Environmental Science and Research

ESR provides science advice and services to government agencies, local authorities and the private sector



## DEFINING SUCCESS: HOW WILL WE MEASURE OUR PERFORMANCE?

Measures	
<b>Impacts</b>	
<ul style="list-style-type: none"> <li>• Early detection of public health hazards and disease outbreaks through the more accurate and timely identification of infectious disease events, leading to reduced incidences and impacts.</li> <li>• Effective interventions are applied by public health organisations to manage and reduce the risk and incidence of public health hazards and diseases, including effective placement of vaccines.</li> </ul>	<p>The accurate typing and identification of diseases and their sources (through our laboratory testing, surveillance and analysis services) is critical to the early detection (of outbreaks) and the right diagnoses (in individual cases). Combined with quick turnaround, accurate positive identification is the main determinant of early detection and effective intervention. Key measures are:</p> <ul style="list-style-type: none"> <li>• accuracy of disease typing by ESR (also a quality measure of output)</li> <li>• accuracy in identification of sources of disease by ESR (also a quality measure of output)</li> <li>• time between presentation of outbreak index cases and implementation of control measures.</li> </ul> <p>Other key measures relating to the effectiveness of interventions that are implemented are:</p> <ul style="list-style-type: none"> <li>• reported effectiveness of ESR information and advice in enabling implementation of effective interventions</li> <li>• extent to which ESR-forecast and -sourced vaccine supply matches virus strains circulating in New Zealand, and supply and location are matched to demand.</li> </ul> <p>Measuring the extent to which our work contributes to a reduction in the harm and costs associated with public health hazards and diseases is challenging, given that our work is only one of a number of inputs to decision-making and actions by others to manage problems and risks. Because of this complexity, and the costs associated with untangling multiple contributors to a public health outcome and modelling the impacts of our specific contribution, we do not currently attempt to quantify our contribution to these overall impacts.</p>
<p>Safer working environment for users and medical recipients of radiation sources.</p>	<ul style="list-style-type: none"> <li>• Environmental radioactivity levels comply with relevant legislation and standards.</li> <li>• Level of compliance by radiation users with relevant legislation and standards.</li> </ul>
<b>Outputs</b>	
<p>Core advisory, information, testing and research outputs, including:</p> <ul style="list-style-type: none"> <li>• National Notifiable Disease Database management</li> <li>• microbiological reference laboratory services</li> <li>• epidemiological analysis and advice</li> <li>• notifications and follow-ups of rare disease notifications</li> <li>• national disease outbreak identification and investigation coordination</li> <li>• national vaccine supply management</li> <li>• NRL.</li> </ul>	<p>Outputs meet quality and timeliness requirements/standards in each case.</p>

## Outcome 2: Increase effectiveness of forensic science services applied to safety, security and justice investigations and processes

*ESR's forensic services will expand into 'ESR Crime Science' by leveraging its existing scientific testing and information services into high-value intelligence that addresses key problems and challenges. This includes providing scientific methodologies for existing and new policy programmes designed to change the behaviour of offenders and/or to reduce the costs incurred by the state to manage their behaviour.*

### WHAT DO WE SEEK TO ACHIEVE?

Through the delivery of government-contracted forensic operations and services, ESR directly supports key justice sector goals relating to reducing crime, holding offenders to account, delivering a trusted justice system, protecting New Zealand's security, and reducing the cost of the justice system.

We need to work within the constrained spending environment of government agencies while at the same time responding to their increasing demands for new and improved services. Our work contributes to the drive for Better Public Services and the sustainable management of the criminal justice 'pipeline'. The New Zealand forensic service provider model has proved to be both cost effective and efficient. New Zealand is one of the few countries in the world that doesn't have a backlog of forensic work. Our turnaround times in DNA analysis are among the best in the world. Through the development of mutually agreed end-to-end processes with justice sector partners we have dramatically improved the timeliness of delivery of forensic services to investigators and to the courts.

The immediate impacts of our work are:

- faster, more effective examinations of crime scenes
- better forensic evidence
- faster, definitive identification of individuals
- a more efficient and effective delivery of evidence at trial.

These immediate impacts will in turn lead to the achievement of justice sector goals through:

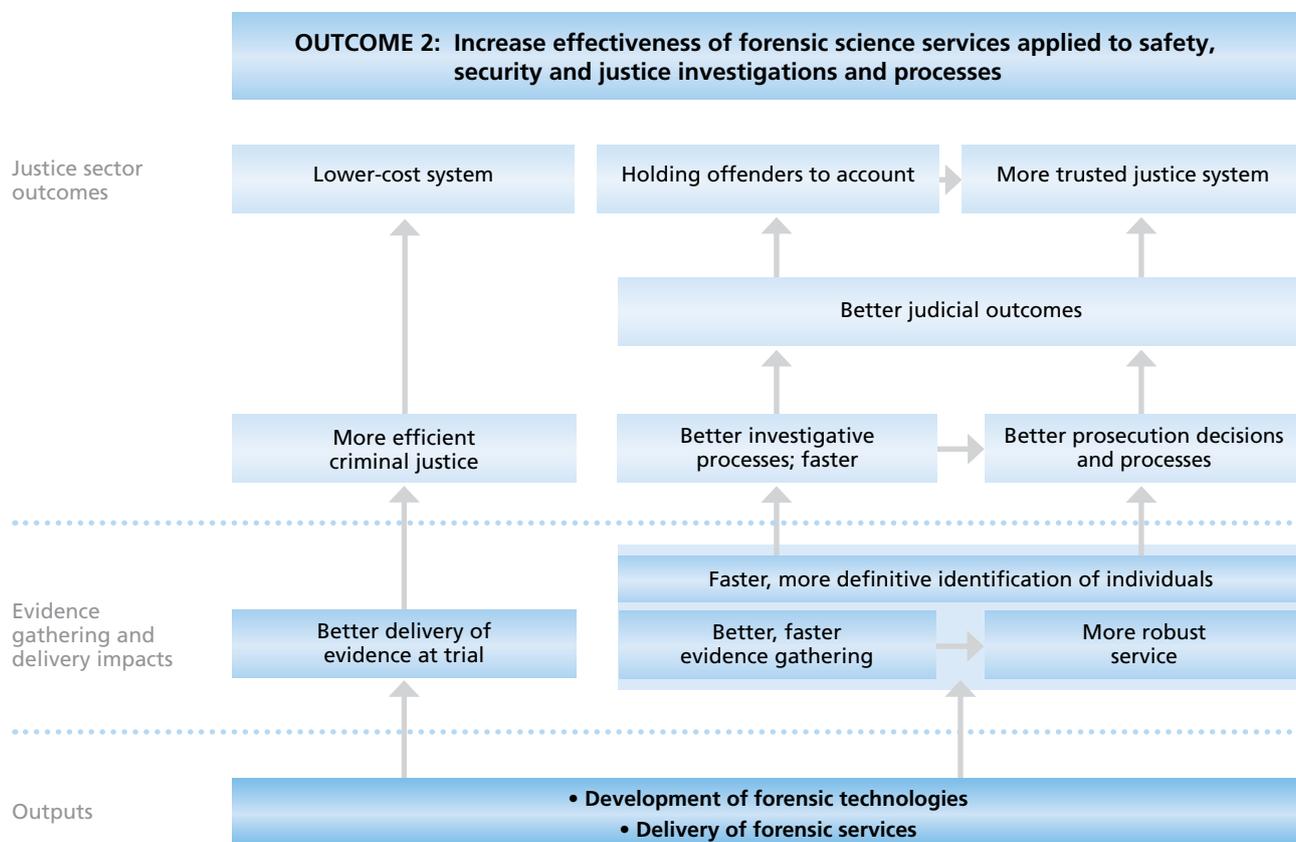
- more effective and efficient investigations, including the earlier apprehension and charging of alleged offenders
- better prosecution decisions
- better judicial outcomes
- lower-cost, more efficient criminal justice processes.

As our new strategic direction becomes embedded in our business plan, we expect in the future to also be contributing to sector growth impacts through an increase in export earnings from innovative, intelligence-based solutions to justice sector problems, engagement with New Zealand security and safety sector companies and the provision of consultancy and training.

Similarly, our intended future focus will support early intervention to reduce longer-term serious crimes. This will lower overall justice system costs through reducing the inflow into the criminal justice pipeline.



**FIGURE 2: RATIONALE FOR OUR CURRENT FORENSIC SERVICE OUTPUTS**



**WHAT WILL WE DO TO ACHIEVE THIS?**

ESR provides forensic services to the New Zealand Police, courts, coroners, pathologists, prisons and the judiciary. We will continue to develop, adapt and innovate new and existing technologies to meet the casework requirements of criminal investigations and the wider needs of the justice system through the:

- delivery of forensic services ‘from the crime scene to the courtroom’ compliant with the international quality accreditation requirements of the Laboratory Accreditation Board of the American Society of Crime Laboratory Directors (ASCLD/LAB). This accreditation is specifically for forensic laboratories and provides a framework for the forensic services that ESR provides and that underpin an effective and trusted criminal justice system. Staff are trained in all aspects of the forensic services that ESR supports, including tikanga Māori
- assessment and implementation of innovative technologies that meet new challenges in criminal investigations
- delivery of scientific evidence rapidly to improve the efficiency of criminal investigations and to support ‘streamlined’ criminal justice processes (including

Government Criminal Procedure Simplification initiatives) by investing in enabling infrastructure

- alignment of forensic science solutions with wider justice sector and crime-reduction initiatives, by making ESR expertise in social systems science available
- provision of innovative services that enhance crime prevention, law enforcement, public safety and justice sector activities, including drug- and alcohol-free workplaces and counterterrorism preparedness.

**WHAT ARE OUR KEY INITIATIVES?**

Key initiatives in the coming year include:

- **the Future Crime Scene project:** ESR has recently developed advanced crime scene recording and expert evidence presentation tools, using core funding. These tools are being piloted, and we intend to pursue their wider implementation. The tools apply spherical photography and laser scanning to record locations of evidence in a way that allows people (such as jurors) to visit a virtual crime scene and clearly see the relationships between items of evidence, and makes complex forensic evidence easier to understand. These technologies are expected to lead to faster crime scene investigations, a

simplified capture of accurate data (e.g. for determining ballistics trajectories), the faster identification of individuals and the more efficient delivery of evidence at trial, saving time and cost

- **international opportunities:** ESR has recognised specialist expertise in DNA interpretation, particularly the interpretation of mixed DNA. The benefits this brings to New Zealand are through being able to offer improved services to the New Zealand justice system and through the reputation earned by ESR as a world leader in this field. An example of the New Zealand sphere of influence in this field is the assistance that ESR has provided to Australian forensic laboratories in the understanding and interpretation of complex DNA results. ESR is partnering with agencies in Australia and the US to provide specialist services. We will be exploring these and other revenue opportunities by offering top-end training and consultancy internationally, which also helps to defray the costs of developing new technologies
- establishing baseline measures across all forensic performance measures as a means to monitor ESR's relative performance in the next five years.

ESR does not currently have a way of measuring on an ongoing basis the impacts of its services and innovations on court times/costs. We will be exploring the feasibility of this kind of evaluation with the Ministry of Justice.

A longer-term objective is to develop innovative science-based products and services that marry forensic and social science in a way that supports early interventions into offending behaviour to save substantial money and harm later through reducing more serious crime and recidivism.

We intend to identify and actively engage with potential new clients and partners to build relationships, in order to be able to deliver science-based innovations that meet their needs, including:

- the insurance and risk management sector, including insurance companies, ACC and property development companies
- businesses undertaking commercialisation and innovation for competitive advantage in international markets, including security system, technology and software companies, and informatics, data mining and modelling companies.

## DEFINING SUCCESS: HOW WILL WE MEASURE OUR PERFORMANCE?

Measures	
<b>Impacts</b>	
<ul style="list-style-type: none"> <li>• Faster, more effective examinations of crime scenes.</li> <li>• More robust forensic evidence.</li> <li>• Faster, definitive identification of individuals.</li> <li>• More efficient and effective delivery of evidence at trial.</li> </ul>	<ul style="list-style-type: none"> <li>• Percentage of loads that give positive results for:               <ul style="list-style-type: none"> <li>– crime-to-crime intelligence links</li> <li>– crime-to-person intelligence links.</li> </ul> </li> </ul> <p>This measure enables a long-term overview of the performance of the DNA Profile Databank, in terms of its ability to support positive identifications and provide valuable intelligence using DNA.</p> <ul style="list-style-type: none"> <li>• Uptake of new services and technologies by New Zealand Police.</li> </ul> <p>The extent to which new technologies and services are adopted is an indicator of the extent to which ESR innovations are providing benefits in terms of better, or more cost-effective, forensic services.</p> <p>ESR does not currently have a way of measuring on an ongoing basis the impacts of its services and innovations on court times/costs. We will be exploring the feasibility of this kind of evaluation with the Ministry of Justice.</p>
<b>Outputs</b>	
DNA Profile Databank management.	Management of the DNA Profile Databank meets all legislative standards and requirements, including New Zealand Police audits.
Forensic services.	<ul style="list-style-type: none"> <li>• Meets contracted turnaround times with New Zealand Police.</li> <li>• Meets agreed performance standards for service quality to New Zealand Police (including overall service rating and consideration of any adverse comments or issues raised).</li> </ul>

## Outcome 3: Enhance protection of New Zealand's food-based economy through the management of food safety risks associated with traded goods

*ESR will leverage its substantial food safety capabilities, including its diagnostic and testing expertise, to focus on the safety and protection of consumers while also maintaining New Zealand's access to key markets and international brand in regard to food safety and integrity.*

### WHAT DO WE SEEK TO ACHIEVE?

New Zealand's economy is heavily dependent on revenues from exported food products, so protecting the integrity of food production systems, our products and our reputation in this area is critical. When sanitary and phytosanitary barriers to trade are raised against New Zealand exports, market access is denied or threatened. Conversely, a strong reputation for trusted food products can be a source of competitive advantage for New Zealand firms when trading in other countries.

New Zealand must continue to meet and exceed standards set by importers of New Zealand products. Our focus is on contributing to the effective management of food safety risks associated with traded goods, and enhancing the integrity and transparency of New Zealand's food supply chain.

Beyond the trade impacts of the food system, a healthy nation is a productive nation. In New Zealand, foodborne illness has been estimated to cost a staggering \$160 million per annum from factors including lost productivity and health care. Our focus is also on helping to diagnose, track and respond rapidly to episodes and outbreaks caused by the consumption of contaminated food.

To achieve these goals, New Zealand must remain ahead of the game scientifically and be recognised internationally as having cutting-edge, robust food safety systems, underpinned by international best practice science. One of ESR's major clients, the Ministry for Primary Industries, relies on ESR's science to inform and assist in the implementation of its internationally respected risk management framework.

Key contextual issues impacting on our work in this area include:

- decreasing tolerance among international partners of biological and chemical contamination of food, resulting in new and increasingly challenging trade barriers

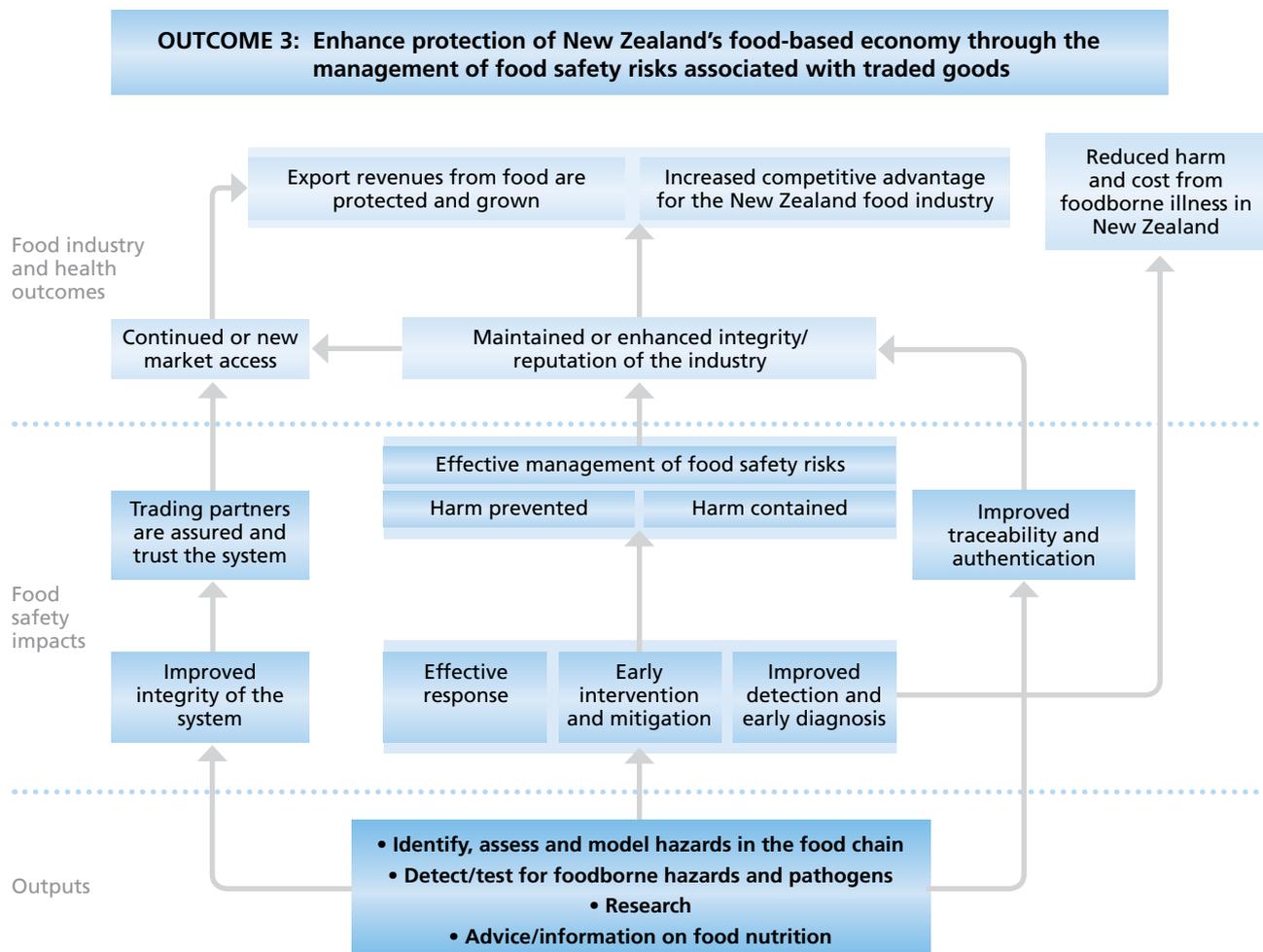
- increasing requirements internationally relating to the traceability of food, including the need for verification of the sources, safety and authenticity of food and food ingredients
- the risk of 'food fraud' that might have a negative impact on the New Zealand brand. Food fraud occurs when products are deliberately mislabelled overseas as being from New Zealand
- the increase in New Zealand production taking place offshore
- a continued burden of foodborne illness affecting the New Zealand public.

The intended impacts of our work are:

- the early detection of food safety risks and problems before consumption
- the prompt diagnosis of foodborne microbial and chemical hazards
- effective responses to food safety issues, including stopping problems before they start
- maintaining and improving the integrity of New Zealand's food production systems.

These impacts will in turn lead to the prevention of harm, and trust in the integrity of New Zealand's food production systems, which will protect and enhance New Zealand's trade position and reduce the costs of illness (both direct costs to individuals and the health system, and the costs of lost productivity).

**FIGURE 3: RATIONALE FOR OUR FOOD SYSTEM INTEGRITY OUTPUTS**



**WHAT WILL WE DO TO ACHIEVE THIS?**

ESR provides advisory, monitoring and diagnostic services, and research to help the regulator and food industry to develop and implement interventions to avoid and respond to foodborne hazards. Our work includes:

- risk-based approaches to the identification, assessment and modelling of microbial and chemical hazards in the food chain
- the use of internationally agreed methods for the detection of foodborne pathogens and chemical hazards (including radiation levels) present in foods and from patient samples, and the development and application of new and rapid methods
- the characterisation of pathogens isolated using specialist and innovative sub-typing methods necessary for outbreak investigations and epidemiological studies

- research to provide new interventions aimed at reducing/eliminating pathogenic *Escherichia coli* (*E. coli*) 0157 (and the so-called Super Six pathogenic *E. coli*) in export and domestic meat
- information for clients on levels of essential nutrients, trace elements and contaminants in the food supply, including the New Zealand Total Diet Surveys undertaken in the past 20 years.

We partner with other providers in New Zealand’s science sector to deliver total solutions, including the Ministry for Primary Industries, Massey University, AgResearch,ASUREQuality, Plant and Food Research and the Cawthron Institute. ESR also has partnerships with leading organisations worldwide, including memoranda of understanding with the US Department of Agriculture and the Chinese Cereals and Oils Association.

## WHAT ARE OUR KEY INITIATIVES?

ESR has unique bio-control products and diagnostic tools that reduce the risk of bacterial contamination during food processing. ESR will leverage these capabilities in the coming year to undertake the following initiatives:

- recent (2011) proposals by the US to change export beef microbiological requirements demonstrate the risks to the New Zealand economy from any issue that cannot be countered or contained. The US has declared zero tolerance for the Super Six strains of *E. coli* most frequently causing disease. New Zealand needs to be able to demonstrate, 'from farm to dock', that these pathogens are not present in consignments. We will be working with the Ministry for Primary Industries to develop world-class methods to detect and characterise the Super Six *E. coli*, so that the screening for these pathogens can become more effective. This will help to protect the \$2 billion per annum New Zealand beef export trade to the US
- further developing novel mitigation strategies for organisms of relevance to the export and domestic food sectors. Our research on phage technologies for the control of pathogenic *E. coli* is the most advanced of our interventions and we will continue to advance our research on naturally occurring novel antimicrobials against *Campylobacter*, a major cause of gastroenteritis in New Zealand

- traceability and food fraud are becoming more significant issues, with the potential for both harm to New Zealand's economy and an opportunity to build a source of advantage based on our reputation (coupled with strong traceability and authentication). We will be carrying out work to support better authentication. An example is work on the authentication of meat species, to ensure that meat being sold is what it claims to be
- establishing baseline measures for all food safety performance measures as a means to monitor ESR's relative performance in the next five years.

We will also identify and engage with new and potential clients to develop an understanding of their needs and how we might be positioned to help them through science-based innovation. These include local and international supermarket chains, food chain technology vendors, international food companies and international government agencies. In future we intend to contribute to innovations in food authentication and traceability that lead to increased competitive advantage for New Zealand food-producing firms.

## DEFINING SUCCESS: HOW WILL WE MEASURE OUR PERFORMANCE?

Measures	
<b>Impacts</b>	
Prompt diagnosis of foodborne microbial and chemical hazards.	Turnaround times for sample investigations (also an output measure of the timeliness of sample analysis).
Prevention of illness caused by consumption of contaminated food.	Analysis time on foods destined for domestic consumption (also an output measure of the timeliness of analysis).
Effective responses to food safety issues.	Extent to which client agencies adopt effective interventions based on advice and research received from ESR.
Maintaining and improving the integrity of New Zealand's food production systems.	<ul style="list-style-type: none"> <li>• Industry perceptions of system integrity, based on formal feedback from key industry players.</li> <li>• Number of consignments (that were tested by ESR) stopped at overseas docks due to detection of <i>E. coli</i>.</li> </ul>
<b>Outputs</b>	
Quality.	<ul style="list-style-type: none"> <li>• Quality of scientific advice and services (as assessed by clients).</li> </ul>

## Outcome 4: Improve the safety of freshwater and groundwater resources for human use and the safer use of biowastes

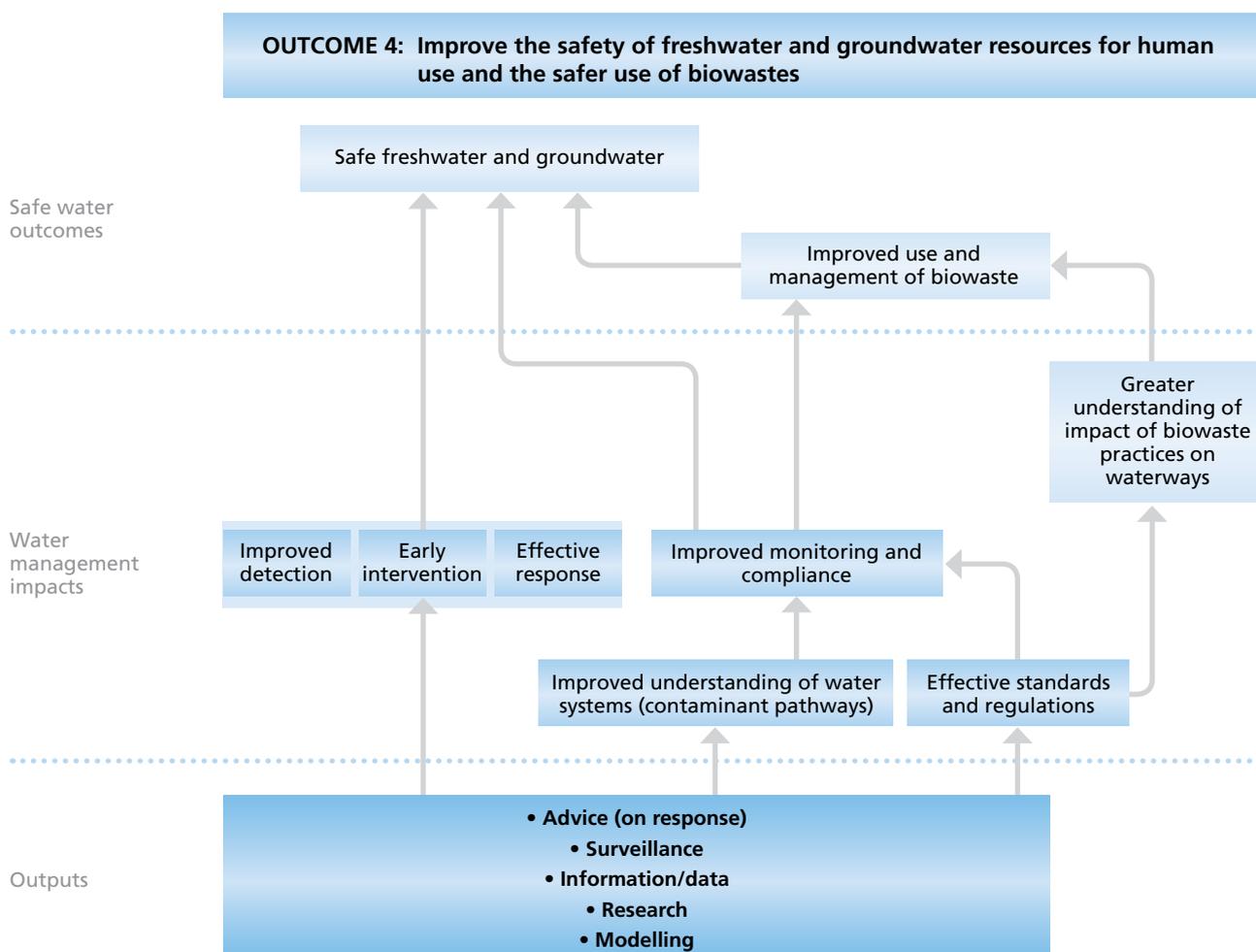
*Water and radiation programmes will leverage ESR's infectious disease knowledge to focus on safe water and environments to protect human health.*

### WHAT DO WE SEEK TO ACHIEVE?

Freshwater is New Zealand's key strategic and productive asset and we are water rich; water provides more than \$5 billion per year to the economy (Minister for the Environment 2011). However, there are water shortages in some areas and increased pressure from land intensification is impacting on the quality and safety of water. Water quality issues can adversely affect our international reputation for food production, environmental practice, health, stock productivity and tourism.

Water management that takes account of competing demands for the resource (drinking water, energy generation, primary production, recreation, tourism etc) is the single biggest environmental problem for New Zealand to solve. Within this overall challenge, ESR aims to contribute to the safety of freshwater and groundwater resources through our understanding of water contaminant transport and attenuation processes and the impacts of the environment on human health, and the contribution that this can make to improving policy.

**FIGURE 4: RATIONALE FOR OUR WATER SAFETY OUTPUTS**



The intended impacts of our work are:

- faster detections of and responses to hazards
- improved water management practice from the perspective of public health impacts
- improved understanding of contaminant pathways in water systems, and the impacts of biowaste practices on waterways
- effective regulation, standards and monitoring
- leveraging New Zealand's unique water science internationally.

### **WHAT WILL WE DO TO ACHIEVE THIS?**

Our major clients – the Ministry of Health, DHBs, public health units and regional and district councils – expect ESR to provide robust advice and underpinning research to inform policy on a range of critical environmental health issues.

ESR will use its knowledge of contaminants and their pathways in the areas of groundwater, wastewater, biowaste and surface water to provide a range of important surveillance and research services to inform policy, including:

- the development of new and the use of internationally recognised methods for the detection of human pathogens and chemical hazards present in water, sediment, soil, biowastes and wastewater
- the use of internationally recognised approaches for public health risk assessments of microbial and chemical hazards in the water environment
- research to characterise contaminant pathways from land into and through groundwater and surface water systems, and the connections between these systems
- research to manage the safe and sustainable use of biowastes such as sewage sludge (biosolids) and greywater resources
- expertise and information to support the implementation of national drinking-water programmes, for example annually surveying and reporting on drinking-water quality in New Zealand, and maintaining registers of community drinking-water supplies.

ESR also has a role to play in constantly refreshing relationships among relevant agencies to assist the national overview. ESR connects research and information across the fields of environment and health, which have historically been funded and managed separately. ESR assists multiple agencies mandated under different legislation (the Resource Management Act 1991 and the Health Act 1956) to fulfil their functions. ESR leads several groundwater research projects in collaboration with other CRIs and universities

and is an active participant in moves to fully integrate freshwater research in New Zealand in partnerships with iwi Māori. We aim to increase partnerships with other science and innovation system participants, including other CRIs, universities and private consulting and engineering firms.

### **WHAT ARE OUR KEY INITIATIVES?**

Key initiatives in the coming year include:

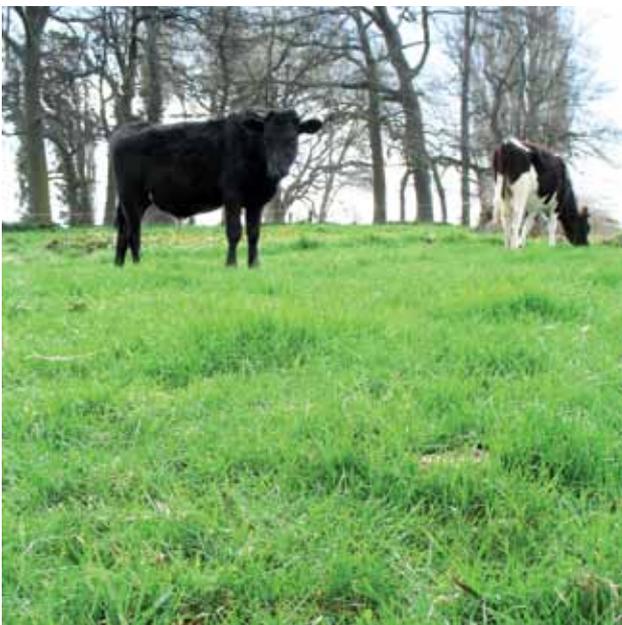
- leveraging our unique human-focused water science into new international areas, and supporting New Zealand's Aid Programme in the Pacific region as part of ESR's growth strategy
- working with the University of Canterbury and other partners to aid the recovery of water quality and safety in Christchurch
- exploiting the high presence of radon in alluvial aquifers in New Zealand and our unique combination of water and radiation science to apply to a number of issues, such as the assessment of surface water recharge into groundwater systems and a possible predictive tool for earthquakes
- continuing to work with our key collaborator Lincoln Ventures and regional councils to assess robustly measures of groundwater assimilative capacity for the key water contaminants of nitrates and microbial pathogens to allow those measures to be incorporated into water management
- working directly with regional and district councils to evaluate different options for their disposal of water and waste. We will increasingly partner with engineering firms to provide solutions to and options for issues that local authorities face in this area, which requires a wide range of inter-disciplinary skills
- continuing to explore the safe and sustainable application of biosolids to land in our case study communities in Kaikōura and Mokai. ESR's expertise in community and stakeholder engagement methodology and the integration of this with our biophysical science expertise in contaminants and effects will aid the case study communities to make informed decisions about sustainable waste management
- partnering with our key collaborator the Cawthron Institute to complete work on the innovative 'up the pipe solutions' initiative, based at the local high school in Kaikōura. We will work with the community to go back 'up the pipe' to better understand and reduce the waste that goes down our drains. The information will help develop solutions that the community can use to improve its waste management
- increasing the level of work performed in the Pacific nations, working through the Ministry of Foreign Affairs

and Trade or directly with regional organisations and national governments. This will fund a more diverse base of expertise than would be possible from New Zealand Government funding only

- establishing baseline measures across all water science performance measures as a means to monitor ESR's relative performance in the next five years.

## DEFINING SUCCESS: HOW WILL WE MEASURE OUR PERFORMANCE?

Measures	
<b>Impacts</b>	
Resource management decisions are well informed by the human health impacts relating to freshwater use.	Level and accuracy of understanding by decision-makers about human health impacts of resource uses relating to freshwater.
Improved water management practice from the perspective of public health impacts.	Level of uptake of better practice amongst stakeholders who are aware of ESR advice and research.
Improved stakeholder understanding of: <ul style="list-style-type: none"> <li>• contaminant pathways in water systems</li> <li>• contaminants in biowastes.</li> </ul>	<ul style="list-style-type: none"> <li>• Level of knowledge and understanding amongst key stakeholders.</li> <li>• Decisions on waste management are understood by stakeholders.</li> </ul>
Effective policy, regulation, standards and monitoring in New Zealand and the Pacific.	Uptake of ESR advice and research in the formulation and implementation of effective policy, regulation, standards and monitoring practice.
<b>Outputs</b>	
Advice, research and information.	<ul style="list-style-type: none"> <li>• Quality of advice and research (including providing relevant, accurate evidence to support policy-making and standard-setting).</li> <li>• Accuracy of information available about drinking water.</li> </ul>
Investigation and information.	Quality and timeliness of hazard investigations, analysis and advice.



# Capability and Resources

## People

ESR is currently developing a forward-thinking organisational strategy that focuses on ensuring the organisation's financial viability and long-term future. One of the key platforms underlying the successful implementation of this strategy is the development and embedding of a high-performance and research-based culture. We will implement and maintain best practice human resources initiatives (such as recruitment, remuneration strategy and structure, and performance management) that support the business in the following areas:

- identifying, nurturing and developing key talent
- developing effective leadership capabilities
- taking an integrated and organisation-wide approach to capability development
- supporting an engaged and energised workforce
- aligning effort and commitment from all people within a core set of values and a clear organisational direction and strategy.

The two key areas of focus in the coming year will be developing management capabilities and putting in place

stronger performance management systems to drive accountabilities down to the individual staff level.

We will use the good employer criteria of the Human Rights Commission to measure the following key aspects of our organisational health:

- our culture is adaptive, client focused and performance oriented
- we attract and retain staff using fair and effective processes
- we invest in staff development and promotion
- our voluntary turnover is kept at moderate levels
- staff can balance their work and life commitments
- we offer a positive, safe and healthy working environment.

ESR's measures of organisational health for our workforce are based on the '7 key elements' of being a good employer published by the Human Rights Commission.

Good employer indicator	Output	Metric
<b>Leadership, Accountability and Culture.</b>	ESR's culture is adaptive, client focused and performance oriented.	<ul style="list-style-type: none"> <li>• Positive trend for overall staff engagement.</li> <li>• Positive behaviours defined within competency framework.</li> <li>• Client satisfaction levels are high (as measured by the State Services Commission Common Measurement Tool).</li> </ul>
<b>Recruitment, Selection and Induction.</b>	Able to attract and retain staff using fair and effective processes	<ul style="list-style-type: none"> <li>• 30% of vacancies filled (offer stage) within four weeks of close.</li> <li>• Turnover of staff with less than six months' service is &lt;5%.</li> </ul>
<b>Employee Development, Promotion and Exit.</b>	ESR invests in staff development and promotion with voluntary turnover at moderate levels.	<ul style="list-style-type: none"> <li>• Appropriate promotion rates.</li> <li>• Learning and development spend as a % of total personnel costs is 3% or more.</li> <li>• 95%+ staff have objectives and development plans.</li> <li>• Staff-initiated turnover at 15% or less.</li> </ul>
<b>Flexibility and Work Design.</b>	ESR enables people to balance their work and life commitments.	<ul style="list-style-type: none"> <li>• % staff working less than full time.</li> <li>• % of parental leave returnees.</li> <li>• % staff with teleworking arrangements.</li> <li>• Percentages to reflect appropriate work/life balance.</li> </ul>

Good employer indicator	Output	Metric
<b>Remuneration, Recognition and Conditions.</b>	ESR's working conditions and pay are fair and competitive.	<ul style="list-style-type: none"> <li>• ESR implements a performance-based remuneration system.</li> <li>• ESR Excellence Awards made.</li> <li>• Staff satisfaction levels with Conditions of Employment.</li> </ul>
<b>Harassment and Bullying Prevention/EEO (Equal Employment Opportunities).</b>	ESR offers a positive working environment for all staff.	<ul style="list-style-type: none"> <li>• Allegations of harassment and bullying are investigated and resolved promptly.</li> <li>• Demographic trends for age, gender, race etc. indicate an appropriate representative workforce.</li> </ul>
<b>Safe and Healthy Environment.</b>	The working environment at ESR is safe and healthy.	<ul style="list-style-type: none"> <li>• Number of work-related ACC claims over \$500.</li> <li>• Working days lost due to sickness.</li> <li>• Zero serious harm accidents.</li> </ul>

## Technology, information and collections

Information management and communication technologies and systems underpin the delivery of ESR's scientific services. We aim to manage the information we hold as an asset across the organisation and for New Zealand. Our information technology systems will:

- be cost effective and reduce the administration load on staff
- support commercial opportunities and international sales through the creation of new products
- enable new ways of mining and using data through the integration of multiple databases onto one platform.

Significant changes in technology are not only creating new demands on ESR's information and communications technology (ICT) (e.g. more storage, more processing power), but creating major opportunities to realise savings, particularly through Infrastructure as a Service (IaaS – providing services on demand and the economies of scale). The demand for access from mobile devices creates opportunities for delivery efficiencies, but the underlying costs in providing secure access for these devices must be carefully managed.

Within ICT services there is a major need to change. Many systems are end-of-life with major and increasing risks around reliability and maintainability.

The major ICT initiative for ESR in the coming year is to implement a new LIMS, with all Health laboratories in ESR to be live by July 2013. The LIMS will introduce business process improvements, enable us to deliver information to and interact with clients more quickly, and enable greater

opportunities to reuse ESR's information. This system will be used in all our areas of business and will position ESR for meeting future client service requirements.

The Enterprise Data Warehouse, as a platform, is now positioned to provide ESR with the required base to enrich access to and the use of enterprise data as a collective digital asset. The delivery of the Laboratory Information Data Model, as part of the new LIMS, is the first step towards a unified data access point in the ESR data landscape. Further, combining LIMS and financial data in a unified platform will deliver the required capability for ESR to support its future growth strategy.

ESR will also be progressing work to:

- migrate to IaaS as quickly and as firmly as possible. Wherever possible, ESR should purchase services at a virtual server level and higher. It should only own its own server hardware where no practical or affordable alternative exists
- implement a secure Virtual Private Network (VPN) so that ESR staff can access ESR systems easily and securely from remote locations. This has to be implemented in parallel with the ESR Business Continuity Plan
- leverage off all-of-government technology contracts.

ESR is also responsible for managing several key databases and collections for the broader benefit of New Zealand. We:

- manage the New Zealand Reference Culture Collection (Medical section) on behalf of the Ministry of Health. ESR assists other CRIs, universities, industries and other laboratories to perform their functions by providing access to the cultures in the Collection on a cost-recovery basis

- are the custodian of the DNA Profile Databank, and ensure that the Databank is maintained and available as a primary criminal intelligence tool for law enforcement and security purposes.

## Science infrastructure and facilities

ESR maintains facilities at five sites. These are located in Auckland, Wellington and Christchurch. The sites are strategically located to support our client base. Strategic five-year goals for the sites are to:

- maximise site utilisation
- ensure that facilities are fit for purpose to support the specialised scientific capabilities required for excellent client services
- apply whole-of-life asset management practices to ensure that the assets remain robust and reliable to support the core business functions and long-term strategic science goals.

The main priorities for the next year are described below. In addition, we will be conducting a full condition review of all sites in this period to serve our longer-term property management strategy.

### NRL RELOCATION TO CHRISTCHURCH SCIENCE CENTRE

ESR acquired NRL on 1 December 2011. The plan initially was for NRL to continue to operate from the Ministry of Health-owned premises in Victoria Street, Christchurch. Although there had been superficial damage from the September 2010 and February 2011 earthquakes, the building was fit for purpose at that time.

The earthquakes of 23 December 2011 adversely affected both the NRL building and the adjacent building. As a result, the NRL premises were yellow-stickered and ESR decided to start the relocation of as many NRL staff as possible, as well as equipment, kit and documents, to the Christchurch Science Centre during the period between Christmas and New Year 2011. Most NRL staff were relocated during January 2012; however, some staff remain at the Victoria Street building as they require ongoing access to the radioactive source there. The relocation of all NRL staff at the Christchurch Science Centre has been given top priority. ESR is currently investigating potential options, with discussions occurring with local authorities, universities and possible property developers.

### MT ALBERT FORENSIC LABORATORY UPGRADE

We are upgrading our Mt Albert site to significantly reduce identified occupational health and safety and security risks and improve our client service, especially for the New Zealand Police. The upgrade will ensure that we provide a suitable environment to support our science excellence. Key benefits include:

- upgraded firearms testing facilities to best practice international standards
- enhanced after hours' safety and security when staff are returning from crime scenes
- enabling an expanded range of firearms testing to occur on site, in particular research including blood pattern analysis testing
- ensuring we can support the full service requirements of our key client the New Zealand Police, as required by our service contract
- improved forensic sample reception/administration process flow, security and safety and improved client management
- enhanced Clandestine Laboratory processing space to provide improved health and safety.

The project will be completed in five stages.

Stage	Detail	Timing
1	Site preparation, biology freezer relocation, site car parking modifications, level 2 offices	Apr – Jun 2012
2	Creation of the Firearms Testing Laboratory and Crime Scene Base Area	Jun – Oct 2012
3	Upgrade of the Physical Evidence Laboratories and creation of secure compounds	Jun – Oct 2012
4	Consolidation of shared non-laboratory areas	Oct – Dec 2012
5	Separation of reception spaces, creation of site shared exhibit storage and shared clean laboratories in Service Centre area	Dec – May 2013

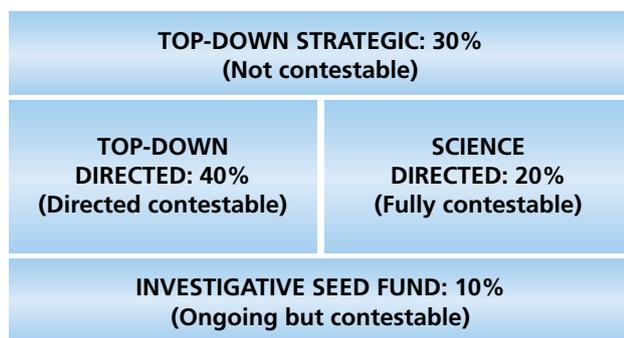
The total project construction time is 14 months, commencing in April 2012 and with final completion in May 2013.

# Investment of Core Funding

## Allocation framework for core funding

Over time, ESR has changed its allocation framework for core funding. The current approach is to allocate core funding through a contestable internal fund. Under this approach, a call is made to staff for concept proposals, with applications required to ensure fit with strategy.

**FIGURE 5. PORTFOLIO ALLOCATION FOR CORE FUNDING**



ESR is in the process of developing a strategic plan that will lead to new strategic initiatives. These strategies will need to be reflected in ESR's core funding allocation processes. Key changes to the investment framework for core funding from 2012/13 are:

- **an increase in the proportion of the 'top-down strategic' allocation of core funding (30%).** This will be allocated entirely by the Chief Executive and senior management team (subject to Board approval) to ensure that key strategic initiatives are progressed. This will be informed by strategic and business planning processes, and will be allocated to areas considered critical to ESR delivering on its Statement of Corporate Intent (SCI) but where current external support is not available. It is anticipated that there will be only a few large projects in this portfolio at any one time. The selection criteria for these projects will be based on strategic fit with ESR's goals, and the impacts on the sectors to which ESR aims to contribute
- **the division of internally contestable funding (60%) into 'top-down (directed contestable) funding' (40%) and 'science-directed (fully contestable) funding' (20%):**
  - top-down-directed funding will be centred on specific topic areas identified in a top-down way by the management team. They will reflect areas where ESR needs to provide science-based innovations that relate to the challenges and opportunities currently facing the sectors in which ESR operates. Projects will be outwardly focused, driven by clear sector issues and with sector support. The aim will be to use the

funding from this portfolio to leverage sector co-funding, helping to drive a partnership approach to developing solutions jointly

- science-directed contestable funds will be fully contestable within ESR and allocated primarily to develop new and emerging capabilities within ESR. They will likely be longer-term projects with a strong focus on science merit and future potential. There remains a need to align with ESR's strategy but not necessarily one of the immediate priority areas
- **the establishment of a small investigative seed fund (10%).** This will provide a small, fully internally contestable fund to allocate small amounts of core funding (up to \$30,000) for short investigative projects with high commercial relevance. Projects will be required to enhance an existing capability or provide evidence for a new science idea. They must also show a path to future development and adoption.

## Planned allocation of core funding across Vote Output expenses and CRI outcome areas

As a result of the substantial change in the way core funding is planned to be allocated in the next five years, a transition period is required in the 2012/13 financial year. A number of existing research projects will continue under the science-directed allocation of the framework outlined above, where benefits are gained in terms of further developing ESR's capabilities and benefiting New Zealand as a whole. ESR receives \$7.7 million of core funding each year. During 2012/13 the science-directed research projects will account for 87% of the core funding received by ESR. Examples of such projects are:

- the Pathogen Discovery Project – the development of new methodologies to allow the rapid identification of new and emerging pathogens that impact on human health, to enable the health system to respond more effectively and efficiently
- Future Crime Scene Technologies – two areas where development is underway to improve efficiency and effectiveness within the justice sector:
  - online scene access for experts to allow the better direction and collection of evidence
  - the use of new visualisation technologies to capture crime scenes that enable accurate crime scene and embedded evidence presentations in court, aimed at reducing the time and costs associated with evidence presentation.



# Food safety



**Protecting and enhancing the nation's health  
and well-being through science**

# Measuring Our Performance

This section sets out the way in which we will assess our performance, including financial and non-financial performance measures.

## Financial performance

### FINANCIAL MEASURES

The five-year financial plan is underpinned by the strategic direction that ESR is proposing in response to the challenges presented (outlined in the section titled 'Strategic Context and Direction'). ESR aims to grow its revenues in the next five years to \$117 million to ensure that the organisation can fund the science and research capabilities required to deliver the sector impacts and client service required in the future.

In 2012/13 we have budgeted revenues of \$62 million rising to \$117 million in 2016/17, earnings before interest and taxation of \$1.6 million rising to \$7.3 million and a return on equity of 2.8% rising to 8.1% by 2016/17.

Our return on equity has been reduced in 2012/13 as a result of ESR needing to invest significantly in infrastructure and core capabilities to ensure that we maintain and improve client service as well as meet compliance requirements e.g. the health and safety of our premises.

### REVENUE

Two clients provide 59% of ESR's revenue (the Ministry of Health and the New Zealand Police). It is necessary for ESR to broaden its revenue base to mitigate commercial risks and improve sector outcomes. While organic growth is expected to make up approximately 31% of the planned future growth, the additional revenues are expected to come from developing partnerships in new sectors and offshore.

### OPERATING EXPENDITURE

Operating expenditure is budgeted to increase from \$60.4 million in 2012/13 to \$109.3 million in 2016/17. In 2012/13 budgeted expenditure increases are due to:

- enhancing capabilities to improve sector engagement and outcomes
- removing any margin associated with core funding
- cost increases due to insurance and KiwiSaver (the full cost now being borne by ESR).

Operating expenditure budgeted in the out years is expected to reflect the activities needed to drive revenue growth. Expenditure as a percentage to revenue is budgeted to decline. Personnel costs remain the largest component of our expenditure; staff numbers are expected to grow in line with revenue growth.

### BALANCE SHEET MANAGEMENT

In the next two years ESR is budgeting for capital expenditure of 10-14% of revenue. This is reflected in the capital renewal ratio, which measures the capital expenditure to depreciation ratio. The ratio is expected to increase to 139% and remain in the vicinity of 100%. This is a reflection of the need for ESR to reinvest to service existing clients and for future growth, including:

- upgrading the essential power supply to ensure continuity of operations as per client contracts with the New Zealand Police and Ministry of Health
- implementing the new computerised LIMS
- refurbishing the Mt Albert Science Centre (to mitigate occupational health and safety issues).

### CASH FLOW

ESR continues to have strong operating cash flows. However, debt is required to fund the extensive capital investment programme to strengthen the core science delivery and support future growth and new business initiatives. ESR will require debt of \$3.1 million in 2013/14, growing to \$16.1 million in 2016/17 (a maximum gearing of 25%).

### DIVIDEND

It is not anticipated that ESR will be in a financial position to have funds available for distribution due to investments and capital projects planned that underpin the growth and financial sustainability of ESR.

### RISKS

- 59% of revenue is sourced from two clients within government. ESR has budgeted for a minimal increase in revenue from these sources. There is a risk that ESR will continue to invest in maintaining our capabilities and client service levels, yet will experience future reductions in revenue from the core contracts.
- Our budget assumes that we will be successful in achieving revenue growth (both organic and new) with our partners within the justice, health and food sectors, to help achieve economic growth for New Zealand.

## FINANCIAL PERFORMANCE INDICATORS 2012 – 2017

	Forecast 11/12	Budget 12/13	Plan 13/14	Plan 14/15	Plan 15/16	Plan 16/17
Revenue (\$000s)	56,889	61,998	70,955	83,198	98,403	116,562
Revenue Growth	–	9.0%	14.4%	17.3%	18.3%	18.5%
<b>Operating Results (\$000s)</b>						
Operating Expenses	48,795	54,235	61,064	71,819	85,736	102,660
EBITDAF	8,094	7,762	9,891	11,379	12,667	13,903
Depreciation and Amortisation	4,919	6,319	7,005	6,515	7,052	6,836
EBIT	3,175	1,626	3,069	5,047	5,798	7,250
Net Profit after Tax	2,447	1,091	1,684	2,826	3,185	3,944
Total Assets	53,546	54,719	59,939	68,427	77,333	87,399
Closing Shareholders' Funds	37,928	39,019	40,703	43,529	46,714	50,658
Capital Expenditure	8,412	8,500	6,835	6,380	5,500	6,505
Capital Expenditure % to Revenue	14.8%	13.7%	9.6%	7.7%	5.6%	5.6%
<b>Liquidity</b>						
Current Ratio	1.3	1.2	1.0	1.0	1.0	1.1
Quick Ratio (Acid Test)	1.1	1.0	0.8	0.8	0.8	0.8
<b>Profitability</b>						
Return on Equity	6.7%	2.8%	4.2%	6.7%	7.1%	8.1%
Return on Total Assets	5.9%	3.0%	5.4%	7.9%	8.0%	8.8%
Operating Margin	14.2%	12.5%	13.9%	13.7%	12.9%	11.9%
Operating Margin per FTE (\$)	21,143	19,737	24,423	27,223	28,723	29,898
<b>Operational Risk</b>						
Profit Volatility	–	3.0%	13.3%	18.1%	21.1%	23.3%
Forecasting Risk	-1.0%	–	–	–	–	–
<b>Coverage</b>						
Interest Cover	N/A	N/A	14.2	9.0	7.2	6.0
<b>Growth/Investment</b>						
Capital Renewal	1.7	1.4	1.0	1.0	0.8	1.0
Dividend	–	–	–	–	–	–
<b>Financial Strength</b>						
Gearing (Debt/Debt Equity) %	N/A	N/A	7.1	14.7	19.8	24.1
Equity Ratio (Equity/Total Assets) %	68.44	71.1	69.5	65.6	61.9	59.1
Cash and Short-Term Deposits (\$Ms)	5.1	3.4	0.0	0.1	0.0	0.0
Debt (\$Ms)	–	–	3.0	7.5	11.0	15.8

Key: Statement of Corporate Intent indicators

## Non-financial performance

In addition to its financial performance measures, ESR will use a range of non-financial performance measures relating to impacts and outputs. These measures have been described in the section on our focus and activities. The table below provides a consolidated view. As ESR finalises its strategic direction, and the implications for the key areas of work, investments and initiatives become clearer, there may be changes to our performance measurement framework.

These changes will be built in to the framework described in next year's SCI. This year we have made changes to our impact and output measures to focus on measures that are more meaningful to assessing our performance and contribution to outcomes. We will be reviewing our data-collection mechanisms to support these measures and will be establishing baselines in the coming year.

### MEASURES RELATED TO SPECIFIC OUTCOME AREAS

Outcomes	Impacts	Impact measures	Output measures
<b>Safeguard the health of New Zealanders through improvements in the management of human biosecurity and threats to public health.</b>	<ul style="list-style-type: none"> <li>• Early detection of public health hazards and disease outbreaks through the more accurate and timely identification of infectious disease events, leading to reduced incidences and impacts</li> <li>• Effective interventions are applied by public health organisations to manage the risk and incidence of public health hazards and diseases, including effective placement of vaccines.</li> <li>• Safer working environment for users and medical recipients of radiation sources.</li> </ul>	<ul style="list-style-type: none"> <li>• Accuracy of disease typing by ESR (also a quality measure of output).</li> <li>• Accuracy in identification of sources of disease by ESR (also a quality measure of output).</li> <li>• Time between presentation of outbreak index cases and implementation of control measures.</li> <li>• Reported effectiveness of ESR information and advice in enabling implementation of effective interventions.</li> <li>• Extent to which ESR-forecast and -sourced vaccine supply matches virus strains circulating in New Zealand, and supply and location are matched to demand.</li> <li>• Environmental radioactivity levels comply with relevant legislation and standards.</li> <li>• Level of compliance by radiation users with relevant legislation and standards.</li> </ul>	Outputs meet quality and timeliness requirements/ standards in each case.
<b>Increase effectiveness of forensic science services applied to safety, security and justice investigations and processes.</b>	<ul style="list-style-type: none"> <li>• Faster, more effective examinations of crime scenes.</li> <li>• More robust forensic evidence.</li> <li>• Faster, definitive identification of individuals.</li> <li>• More efficient and effective delivery of evidence at trial.</li> </ul>	<ul style="list-style-type: none"> <li>• Percentage of loads that give positive results for: <ul style="list-style-type: none"> <li>– crime-to-crime intelligence links</li> <li>– crime-to-person intelligence links.</li> </ul> </li> <li>• Uptake of new services and technologies by New Zealand Police.</li> </ul>	<ul style="list-style-type: none"> <li>• Management of the DNA Profile Databank meets all legislative standards and requirements, including New Zealand Police audits.</li> <li>• Meets contracted turnaround times with New Zealand Police.</li> <li>• Meets agreed performance standards for service quality to New Zealand Police (including overall service rating and consideration of any adverse comments or issues raised).</li> </ul>

Outcomes	Impacts	Impact measures	Output measures
<b>Enhance protection of New Zealand's food-based economy through the management of food safety risks associated with traded goods.</b>	<ul style="list-style-type: none"> <li>Prompt diagnosis of foodborne microbial and chemical hazards.</li> <li>Prevention of illness caused by consumption of contaminated food.</li> <li>Effective responses to food safety issues.</li> <li>Maintaining and improving the integrity of New Zealand's food production systems.</li> </ul>	<ul style="list-style-type: none"> <li>Turnaround times for sample investigations (also an output measure of the timeliness of sample analysis).</li> <li>Analysis time on foods destined for domestic consumption (also an output measure of the timeliness of analysis).</li> <li>Extent to which client agencies adopt effective interventions based on advice and research received from ESR.</li> <li>Industry perceptions of system integrity, based on formal feedback from key industry players.</li> <li>Number of consignments (that were tested by ESR) stopped at overseas docks due to detection of <i>E. coli</i>.</li> </ul>	Quality of scientific advice and services (as assessed by clients).
<b>Improve the safety of freshwater and groundwater resources for human use and the safer use of biowastes.</b>	<ul style="list-style-type: none"> <li>Resource management decisions are well informed by the human health impacts relating to freshwater use.</li> <li>Improved water management practice from the perspective of public health impacts.</li> <li>Improved stakeholder understanding of: <ul style="list-style-type: none"> <li>contaminant pathways in water systems</li> <li>contaminants in biowastes.</li> </ul> </li> <li>Effective policy, regulation, standards and monitoring in New Zealand and the Pacific.</li> </ul>	<ul style="list-style-type: none"> <li>Level and accuracy of understanding by decision-makers about human health impacts of resource uses relating to freshwater.</li> <li>Level of uptake of better practice amongst stakeholders who are aware of ESR advice and research.</li> <li>Level of knowledge and understanding amongst key stakeholders.</li> <li>Decisions on waste management are understood by stakeholders.</li> <li>Uptake of ESR advice and research in the formulation and implementation of effective policy, regulation, standards and monitoring practice.</li> </ul>	<ul style="list-style-type: none"> <li>Quality of advice and research (including providing relevant, accurate evidence to support policy-making and standard-setting).</li> <li>Accuracy of information available about drinking water.</li> <li>Quality and timeliness of hazard investigations, analysis and advice.</li> </ul>



## CROSS-CUTTING NON-FINANCIAL PERFORMANCE MEASURES

Focus	Measures
<p><b>End-user collaboration</b></p> <p>Develop strong, long-term partnerships with industry, government and Māori, and work with them to set research priorities that are well linked to the needs and potential of their end-users.</p>	<ul style="list-style-type: none"> <li>Percentage and number of relevant funding partners and other end-users that have a high level of confidence in ESR's ability to set research priorities, and the effectiveness of the collaborations and partnerships (survey data). Annually.</li> <li>Total dollar value of revenue (in cash and in kind) and dollar value subcontracted to other organisations from each 'source category' per annum from rolling five years (administrative data). Quarterly.</li> </ul>
<p><b>Research collaboration</b></p> <p>Develop collaborative relationships with other CRIs, universities and other research institutions within New Zealand and internationally to form the best teams to deliver ESR's core purpose.</p>	<ul style="list-style-type: none"> <li>Percentage of relevant national and international research providers that have a high level of confidence in ESR's ability to form the best teams to deliver on ESR's outcomes (survey data). Annually.</li> <li>Number and percentage of joint scientific peer-reviewed publications and intellectual property (IP) outputs with other New Zealand and international research institutions per annum (administrative data). Quarterly.</li> <li>Number of research collaborations with CRIs, universities and international organisations.</li> <li>Number of joint research projects.</li> <li>New revenue from expanded international collaborations (particularly Australia, Europe and the US).</li> </ul>
<p><b>Technology and knowledge transfer (science relevance)</b></p> <p>Transfer technology and knowledge from domestic and international sources to New Zealand industry, government and Māori.</p>	<ul style="list-style-type: none"> <li>Total number and percentage of licensing deals of ESR-derived IP (including technologies, products and services) with New Zealand and international partners per annum (administrative data). Quarterly.</li> <li>Percentage of relevant end-users who have adopted knowledge and/or technology from ESR (survey data). Annually.</li> <li>Percentage change in the number of requests for and enquiries about ESR's publicly available collections (administrative data). Quarterly.</li> <li>Number of training programmes delivered, number of officers trained.</li> </ul>
<p><b>Science quality</b></p> <p>Pursue excellence in all ESR's activities.</p>	<ul style="list-style-type: none"> <li>Total number of international awards, invitations to participate on international committees, and editorial boards for ESR's published papers, per annum. Annually.</li> <li>Average number of citations per ESR published paper. Annually.</li> <li>Proportion of published papers in the top 25 journals of international quality relevant to the scope of ESR. Annually.</li> </ul>





# Appendix 1:

## Statement of Core Purpose

ESR's purpose is to deliver enhanced scientific and research services to the public health, food safety, security and justice systems and the environmental sector to improve the safety and contribute to the economic, environmental and social well-being of people and communities in New Zealand.

### OUTCOMES

ESR will fulfil its purpose through the provision of research and scientific services and the transfer of technology and knowledge in partnership with key stakeholders including government, industry, the community and Māori to:

- safeguard the health of New Zealanders through improvements in the management of human biosecurity and threats to public health (Outcome 1)
- increase the effectiveness of forensic science services applied to safety, security and justice investigations and processes (Outcome 2)
- enhance the protection of New Zealand's food-based economy through the management of food safety risks associated with traded goods (Outcome 3)
- improve the safety of freshwater and groundwater resources for human use and the safer use of biowastes (Outcome 4).

### SCOPE OF OPERATION

To achieve these outcomes, ESR is the lead CRI in the following areas:

- forensic science services
- harm prevention from drugs and alcohol
- surveillance of human pathogens and zoonotic diseases
- domestic and export food safety in partnership with the regulator
- impacts of the environment on human health including groundwater, freshwater and drinking-water quality and safe biowaste use
- integrated social and biophysical research to support decision-making in the environmental, public health and justice sectors.

ESR will work with other research providers and end-users to contribute to the development of the following areas:

- assessing and responding to chemical, biological, radiological and explosive events and environmental threats, including adverse human impacts on natural resources
- biosecurity and freshwater management
- climate change adaptation and mitigation.

### OPERATING PRINCIPLES

ESR will:

- operate in accordance with an SCI and business plan that describe how ESR will deliver against this Statement of Core Purpose, and describe what the shareholders will receive for their investment
- meet its obligations as a Crown Company and remain financially viable, delivering an appropriate rate of return on equity
- develop strong, long-term partnerships with key stakeholders, including government, industry and Māori and work in partnership with them to set priorities for research and service delivery that are well linked to the needs and potential of its end-users
- maintain a balance of research and scientific services that both provide for the near-term requirements of its sectors and demonstrate vision for their longer-term benefit
- transfer technology and knowledge from domestic and international sources to key New Zealand stakeholders, including industry, government and Māori
- develop collaborative relationships with other CRIs, universities and other research institutions (within New Zealand and internationally) to form the best teams to deliver its core purpose
- provide advice on matters of its expertise to the Crown
- represent New Zealand's interests on behalf of the Crown through contributions to science diplomacy and international scientific issues and/or bodies as required
- seek advice from scientific and user advisory panels to help ensure the quality and relevance of its research and scientific services
- establish policies, practices and a culture that optimise talent recruitment and retention
- enable the innovation potential of Māori knowledge, resources and people
- maintain its databases, collections and infrastructure and manage the scientific and research data it generates in a sustainable manner, providing appropriate access and maximising the reusability of data sets
- seek shareholder consent for significant activity beyond its scope of operation.

# Appendix 2: Business Policies

ESR operates in accordance with the purpose and principles as stated in the Crown Research Institutes Act 1992 and has statutory obligations under other Acts including the Companies Act 1993 and Crown Entities Act 2004. Significant services are performed for the New Zealand Police under the Land Transport Act 1998 and the Misuse of Drugs Act 1975.

Policies and procedures are in place to ensure that all of our statutory obligations are met, including policies on:

- risk management
- shareholder consent for significant transactions
- intellectual property
- databases and collections
- dividends
- information to be disclosed
- accounting.

ESR's business policies are publicly available on the ESR website. [Click here to open](#)



# Appendix 3: Statement of Significant Accounting Policies

## A) REPORTING ENTITY

The financial statements of the Institute of Environmental Science and Research Limited ('ESR') have been prepared in accordance with the requirements of the Crown Entities Act 2004, the Crown Research Institutes Act 1992, the Companies Act 1993 and the Financial Reporting Act 1993. ESR provides specialist scientific solutions, including working with the New Zealand justice and health sectors to promote the protection of people and their environment. ESR is a Crown Entity incorporated and domiciled in New Zealand. The address of its registered office is 34 Kenepuru Drive, Porirua 5240.

## B) BASIS OF PREPARATION

The financial statements are prepared on the basis of historical cost. These policies have been consistently applied to all the periods presented, unless otherwise stated.

The financial statements are Parent and Group financial statements. The two subsidiaries of ESR are dormant non-trading entities; consequently there is no difference between the financial statements of the Group and those of the Parent.

## C) STATEMENT OF COMPLIANCE

These financial statements have been prepared in accordance with New Zealand Generally Accepted Accounting Practice (NZ GAAP). They comply with New Zealand equivalents to the International Financial Reporting Standards (NZ IFRS) and other applicable financial reporting standards, as appropriate for profit-oriented entities. These consolidated financial statements comply with International Financial Reporting Standards.

## D) ACCOUNTING ESTIMATES AND JUDGEMENTS

The preparation of financial statements in conformity with NZ IFRS requires judgements, estimates and assumptions that affect the application of policies and reported amounts of assets and liabilities, income and expenses. The estimates and associated assumptions are based on historical experience and various other factors that are believed to be reasonable under the circumstances. Actual results may differ from these estimates.

Management's judgements, which have the most significant effect on amounts recognised in the financial statements, are found in Revenue, Employee Benefits, and Taxation.

### i) Revenue

The Group uses the stage-of-completion method in accounting for its fixed-price contracts to deliver scientific services. The use of the percentage-of-completion method

requires the Group to estimate the services performed to date as a proportion of the total services to be performed. Stage of completion is calculated and reviewed monthly, and significant variances are investigated to ensure that the percentage-of-completion estimate is reasonable and in line with the overall project plan, estimated completion date and prior measurements of progress.

### ii) Employee benefits

In determining the future entitlements of employees, management is required to make judgements on anticipated length of service, future salary levels and discount rates. Reference is made to historical data in determining appropriate factors to apply.

Key assumptions:

- anticipated length of service: Management opinion is that current length of service and staff turnover rate provide an accurate basis for determining future length of service
- future salary levels: Management considers the rate of inflation and the current employment market over a three- to five-year horizon in arriving at a suitable rate for wage increases
- discount rates: Management uses the five-year Government Bond interest rate as a discount factor.

## E) PRINCIPLES OF CONSOLIDATION

### Subsidiaries

The consolidated financial statements incorporate the assets and liabilities of all subsidiaries of ESR and the results of the operations of all subsidiaries. ESR and its subsidiaries together are referred to in these financial statements as the Group.

Subsidiaries are all those entities over which the Group has the power to govern financial and operating policies, generally accompanying a shareholding of more than one-half of the voting rights. The existence and effect of potential voting rights that are currently exercisable or convertible are considered when assessing whether ESR controls another entity.

Subsidiaries that form part of the Group are consolidated from the date on which control is transferred to ESR. They are de-consolidated from the date that control ceases.

The acquisition method of accounting is used to account for the acquisition of subsidiaries by the Group. The cost of an acquisition is measured as the fair value of the assets given, equity instruments issued and liabilities incurred or assumed

at the date of exchange. Identifiable assets acquired and liabilities and contingent liabilities assumed in a business combination are measured initially at their fair values at the acquisition date, irrespective of the extent of any non-controlling interest. The excess of the cost over the fair value of the Group's share of the identifiable net assets acquired is recorded as goodwill. If the cost of acquisition is less than the Group's share of the fair value of the identifiable net assets of the subsidiary acquired, the difference is recognised directly in the Statement of Comprehensive Income.

Intercompany transactions, balances and unrealised gains on transactions between subsidiary companies are eliminated. Unrealised losses are also eliminated unless the transactions provide evidence of the impairment of the assets transferred. Accounting policies of subsidiaries are consistent with those policies adopted by the Group.

## **F) PROPERTY, PLANT AND EQUIPMENT**

Items of property, plant and equipment are initially recorded at cost, and subsequently at cost less accumulated depreciation and impairment. The cost of property, plant and equipment includes the value of the consideration given to acquire the assets and the value of other directly attributable costs that have been incurred in bringing the assets to the location and condition necessary for their intended use.

The carrying amounts of plant, property and equipment are reviewed at least annually to determine if there is any indication of impairment. Where an asset's recoverable amount is less than its carrying amount, it will be reported at its recoverable amount and an impairment loss will be recognised. Losses resulting from impairment are reported in the Statement of Comprehensive Income.

Realised gains and losses arising from the disposal of property, plant and equipment are recognised in the Statement of Comprehensive Income in the periods in which the transactions occur.

Depreciation is charged on a straight-line basis at a rate calculated to allocate the cost of an item of property, plant and equipment, less any estimated residual value, over its estimated useful life. The estimated useful lives of different classes of property, plant and equipment are as follows:

Freehold Buildings	20 – 50 years
Leasehold improvements	10 years
Plant, equipment and vehicles	3 – 10 years
IT equipment and internal software	3 – 7 years

## **G) INTANGIBLE ASSETS**

### ***i) Computer software***

Items of computer software that do not comprise an integral part of the related hardware are treated as intangible assets with finite lives. Intangible assets with finite lives are recorded at cost, and subsequently recorded at cost less any accumulated amortisation and impairment losses. Amortisation is charged to the Statement of Comprehensive Income on a straight-line basis over the useful lives of the assets. Typically, the estimated useful life of computer software is three years.

### ***ii) Development costs – internally generated intangible assets***

The cost of an internally generated intangible asset represents expenditure incurred in the development phase of the asset only. The development phase occurs after the following can be demonstrated: technical feasibility; ability to complete the asset; intention and ability to sell or use the asset; ability to generate probable future economic benefits; and development expenditure can be reliably measured. Expenditure incurred on research of an internally generated intangible asset is expensed when it is incurred. Where the research phase cannot be distinguished from the development phase, the expenditure is expensed when it is incurred.

### ***iii) Goodwill – on acquisition of businesses***

Goodwill represents the excess of the cost of an acquisition over the fair value of the Group's share of the net identifiable assets acquired and liabilities assumed at the date of acquisition. If this consideration transferred is lower than the fair value of the net identifiable assets acquired, the difference is recognised in the Statement of Comprehensive Income. After initial recognition, goodwill is measured at the amount recognised at acquisition less any accumulated impairment losses. For the purpose of impairment testing, goodwill acquired in a business combination is allocated to the cash-generating unit applicable. Impairment is determined by assessing the recoverable amount of the cash-generating unit to which the goodwill relates. The Group performs its impairment testing whenever there is an indicator that an asset identified may be impaired using a discounted cash flow approach under the fair value less cost to sell methodology for the cash-generating unit applicable. When the recoverable amount of a cash-generating unit is less than the carrying amount, an impairment loss is recognised. Impairment losses on goodwill are not reversed. Goodwill associated with a cash-generating unit disposed of is included in the carrying amount of the operation when determining the gain or loss on disposal of the operation.

## H) IMPAIRMENT OF NON-FINANCIAL ASSETS

Assets that are subject to amortisation are reviewed for impairment whenever events or changes in circumstances indicate that the carrying amounts may not be recoverable. An impairment loss is recognised for the amount by which an asset's carrying amount exceeds its recoverable amount. The recoverable amount is the higher of the asset's fair value less costs to sell and value in use. For the purposes of assessing impairment, assets are grouped at the lowest levels for which there are separately identifiable cash flows (cash-generating units).

## I) TAXATION

The income tax expense for the period is the tax payable on the current period's taxable income based on the national income tax rate for each jurisdiction. This is then adjusted by changes in deferred tax assets and liabilities attributable to temporary differences between the tax bases of assets and liabilities and their carrying amounts in the financial statements, and unused tax losses.

Deferred tax assets and liabilities are recognised for temporary differences at the tax rates expected to apply when the assets are recovered or liabilities settle. The relevant tax rates are applied to the cumulative amount of deductible and taxable temporary differences to measure the deferred tax asset or liability. An exception is made for certain temporary differences arising from the initial recognition of an asset or a liability. No deferred tax asset or liability is recognised in relation to temporary differences if they arose in a transaction other than a business combination, and at the time of the transaction did not affect either accounting profit or taxable profit or loss.

Deferred tax assets are recognised for deductible temporary differences and unused tax losses only if it is probable that future taxable amounts will be available to utilise those temporary differences and losses.

Deferred tax liabilities and assets are not recognised for temporary differences between the carrying amounts and the tax bases of investments in controlled entities where the Parent entity is able to control the timing of the reversal of the temporary differences and it is probable that the differences will not reverse in the foreseeable future.

Deferred income tax assets are recognised to the extent that it is probable that future taxable profit will be available against which the temporary differences can be utilised.

## J) CASH AND CASH EQUIVALENTS

Cash means cash on hand, demand deposits and other highly liquid investments in which ESR has invested as part of its day-to-day cash management. The following

definitions are used in the Statement of Cash Flows:

- investing activities are those activities relating to the acquisition, holding and disposal of fixed assets and investments;
- financing activities are those activities that result in changes in the size and composition of the capital structure of ESR, and this includes both equity and debt not falling within the definition of cash. Dividends paid in relation to the capital structure are included in financing activities
- operating activities are the principal revenue-producing activities and other activities that are not investing or financing activities.

## K) TRADE AND OTHER RECEIVABLES

Trade receivables are stated at their estimated realisable value after providing against debts where collection is doubtful. An estimate of the value of doubtful debts is made based on a review of debts at year end. Bad debts are written off in the period in which they are identified.

## L) INVENTORIES

Stocks of consumables and work in progress are stated at the lower of cost and net realisable value. Cost is determined on a first in, first out basis.

## M) TRADE AND OTHER PAYABLES

These amounts represent the best estimate of the expenditure required to settle obligations arising from goods and services provided to ESR prior to period end. These amounts are unsecured and are usually paid within 30 days of recognition. Liabilities and provisions to be settled beyond 12 months are recorded at their present value.

## N) EMPLOYEE BENEFITS

### ***i) Wages, salaries and annual leave***

Liabilities for wages and salaries, including annual leave, that are expected to be settled within 12 months of the reporting date are recognised in respect of employees' services up to the reporting date and are measured at the amounts expected to be paid when the liabilities are settled.

Obligations for contributions to defined contribution retirement plans are recognised in the Statement of Comprehensive Income as they fall due.

### ***ii) Long service leave, retirement leave and development leave***

The liability for long service leave, retirement leave and development leave is recognised as an employee benefit liability and measured as the present value of expected

future payments to be made in respect of services provided by employees up to the reporting date. Consideration is given to the expected future salary levels, experience of employee departures and periods of service. Expected future payments are discounted using market yields at the reporting date for Government Bonds with terms to maturity and currency that match, as closely as possible, the estimated future cash outflows.

## **O) LEASES**

Finance leases transfer to ESR, as lessee, substantially all the risks and rewards incidental to ownership of a leased asset. Initial recognition of a finance lease results in an asset and liability being recognised at amounts equal to the lower of the fair value of the leased asset or the present value of the minimum lease payments. Each lease payment is allocated between the liability and finance charges so as to achieve a constant rate of finance charge over the term of the lease. Property, plant and equipment acquired under finance leases are depreciated over the shorter of the assets' useful lives and lease terms.

Leases in which a significant portion of the risks and rewards of ownership are retained by the lessor are classified as operating leases. Payments made under operating leases (net of any incentives received from the lessors) are charged to the Statement of Comprehensive Income on a straight-line basis over the period of the leases.

## **P) BORROWINGS**

Borrowings are initially recognised at fair value, net of costs incurred. Borrowings are subsequently measured at amortised cost. Any differences between the proceeds (net of transaction costs) and the redemption amounts are recognised in the Statement of Comprehensive Income over the period of the borrowing using the effective interest method.

Borrowings are classified as current liabilities unless ESR has an unconditional right to defer settlement of a liability for at least 12 months after the balance date.

## **Q) SHARE CAPITAL**

Ordinary shares are classified as equity.

Incremental costs directly attributable to the issue of new shares or options are shown as appropriate in equity as a deduction, net of tax, from the proceeds.

## **R) REVENUE**

### ***i) Sales of goods and services***

Revenue is earned by ESR in exchange for the provision of outputs (services) to third parties. Revenue from the supply of services is measured at the fair value of consideration

received. Revenue from the supply of services is recognised in the accounting period in which the services are rendered, by reference to the stage of completion of the specific transactions assessed on the basis of the actual services provided as a proportion of the total services to be provided. Any revenue for which services have not been supplied as at the reporting date but for which payment has been received is deferred within the Statement of Financial Position as revenue in advance.

### ***ii) Interest income***

Interest income is recognised in the Statement of Comprehensive Income on a time proportion basis, using the effective interest rate method.

### ***iii) Vaccine revenue***

ESR purchases vaccines on behalf of the Crown or its delegate. The Crown or its delegate maintains the risks and rewards related to the inventory and as such no inventory is recognised within ESR's Statement of Financial Position. ESR receives and recognises commission revenue only in relation to the services performed.

## **S) FOREIGN CURRENCY**

Items included in the financial statements of each of the Group's entities are measured using the currency of the primary economic environment in which the entity operates. The Group financial statements are presented in New Zealand dollars, which is ESR's functional and presentation currency.

Transactions in foreign currencies are initially translated at the foreign exchange rates at the dates of the transactions. Foreign exchange gains and losses resulting from the settlement of such transactions, and from the translation at year-end exchange rates of monetary assets and liabilities denominated in foreign currencies, are recognised in the Statement of Comprehensive Income.

Non-monetary assets and liabilities measured at historical cost in a foreign currency are translated using the exchange rate at the date of the transaction.

## **T) GOODS AND SERVICES TAX**

Items in the Statement of Comprehensive Income and Statement of Cash Flows are disclosed net of Goods and Services Tax ("GST"). All items in the Statement of Financial Position are stated net of GST with the exception of receivables and payables, which include GST invoiced.

## **U) DIVIDENDS**

A provision is made for the amount of any dividend declared on or before the end of the financial year but not distributed at balance date.

## **V) FINANCIAL INSTRUMENTS**

The designation of financial assets and financial liabilities by ESR into instrument categories is determined by the business purposes of the financial instruments, policies and practices of management, the relationship with other instruments and the reporting costs and benefits associated with each designation. The designations applied by ESR are reflected in the financial statements.

### ***i) Financial assets***

#### **Classification**

The Group classifies its financial assets as loans and receivables. Management determines the classification of its financial assets at initial recognition.

#### ***(a) Loans and receivables***

Loans and receivables are non-derivative financial assets with fixed or determinable payments that are not quoted in an active market. They are included in current assets, except for maturities greater than 12 months after the reporting date. These are classified as non-current assets. ESR's loans and receivables comprise 'trade and other receivables' and 'cash and cash equivalents' in the Statement of Financial Position.

#### ***(b) Recognition and measurement***

Regular purchases and sales of financial assets are recognised on the trade-dates – the dates on which the Group commits to purchase or sell the assets. Investments are initially recognised at fair value plus transaction costs for all financial assets not carried at fair value through profit or loss. Financial assets are derecognised when the rights to receive cash flows from the investments have expired or have been transferred and the Group has transferred substantially all risks and rewards of ownership. Loans and receivables are carried at amortised cost using the effective interest method.

The Group assesses at each reporting date whether there is objective evidence that a financial asset or a group of financial assets is impaired.

### ***ii) Financial liabilities***

Financial liabilities held by ESR include trade and other payables.

Such financial liabilities are recognised initially at fair value less transaction costs and subsequently measured at amortised cost using the effective interest rate method. Financial liabilities entered into with durations less than 12 months are recognised at their nominal value.

### ***iii) Derivatives***

Derivative financial instruments are recognised both initially and subsequently at fair value. They are reported as either assets or liabilities depending on whether the derivatives are in a net gain or net loss position. ESR does not use hedge accounting, and as such derivatives are classified as held-for-trading financial instruments with fair value gains or losses recognised in the Statement of Comprehensive Income. Such derivatives are entered into for risk management purposes.

## **W) PROVISIONS**

Provisions are recognised when: ESR has a present legal or constructive obligation as a result of past events; it is probable that an outflow of resources will be required to settle the obligation; and the amount can be reliably estimated. Provisions are not recognised for future operating losses.

Provisions are measured at the present value of the expenditure expected to be required to settle the obligation using a pre-tax rate that reflects current market assessments of the time value of money and the risks specific to the obligation. The increase in the provision due to the passage of time is recognised as an interest expense.

# Appendix 4: Directory

## Directors

Dr Susan Macken – Chair

Ross Peat – Deputy Chair

Dr Judith Johnston

Elizabeth Hickey

Patricia Schnauer

Professor Bill Denny

Tahu Potiki

## Chief Executive

Graham Smith

## Senior managers

Dr Keith Bedford, General Manager, Forensic

Dr Fiona Thomson-Carter, General Manager,  
Environmental Health

Esther Livingston, General Manager, Human Resources

Nishaka Ranaweera, Chief Information Officer (Acting)

Nigel Thomson, General Manager, Finance (Acting)

Dr Val Orchard, Strategic Manager, Science and Research

David Talbot, General Manager, Business Development  
and Marketing

## Registered office

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## Auditor

Chris Barber of PricewaterhouseCoopers on behalf of the  
Auditor-General

## Banker

National Bank of New Zealand

## Solicitor

Buddle Findlay



# Safe drinking water



Protecting and enhancing the nation's health  
and well-being through science



Institute of Environmental Science and Research  
Protecting and enhancing the nation's health and well-being through science  
*Manaaki tangata taiao hoki*

