

Lessons learned from one of New Zealand's most challenging civil engineering projects: rebuilding the earthquake damaged pipes, roads, bridges and retaining walls in the city of Christchurch 2011 - 2016.

## Identifying Canterbury Rebuild Project KPI's – Baseline Report

**Story:** Academic Studies – Driving Innovation in the Construction Industry

**Theme:** Programme Management

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A report created by BRANZ, the University of Auckland and Constructing Excellence New Zealand which was commissioned by the Productivity Partnership. It examines the use of KPIs by a number of rebuild organisations.

This document has been provided as an example of a tool that might be useful for other organisations undertaking complex disaster recovery or infrastructure rebuild programmes.

For more information about this document, visit [www.scirtlearninglegacy.org.nz](http://www.scirtlearninglegacy.org.nz)



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# CANTERBURY KPI PROJECT

## Identifying Canterbury Rebuild Project KPI's – Baseline Report

November 2012

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## **Table of Contents**

<b>1</b>	<b>Executive Summary</b>	<b>1</b>	5.2.3	Quality (30% KPI weighting)	19
<b>2</b>	<b>Introduction</b>	<b>3</b>	5.2.4	Cost	20
2.1	Productivity Partnership	4	5.2.5	Other KPI's of interest	20
2.2	Evidence Work Stream	4	5.3	Arrow International performance data	20
2.3	Project Methodology	5	5.4	Naylor Love performance data	21
<b>3</b>	<b>Research Participants</b>	<b>8</b>	5.5	Data Analysis	21
3.1	Earthquake Recovery (EQR)	8	5.5.1	SCIRT	21
3.2	Stronger Christchurch Infrastructure Rebuild Team (SCIRT)	9	5.5.2	Arrow International	24
3.3	Arrow International (PMO to Southern Response)	10	5.5.3	Naylor Love	26
3.4	Naylor Love	11	<b>6</b>	<b>Achieving 20% by 2020</b>	<b>28</b>
<b>4</b>	<b>Performance Measurement</b>	<b>12</b>	<b>7</b>	<b>Conclusions</b>	<b>29</b>
4.1	KRI'S and KPI's	12	<b>8</b>	<b>Recommendations</b>	<b>31</b>
4.2	Best Practice and Benchmarking	13	<b>9</b>	<b>Bibliography &amp; References</b>	<b>32</b>
4.3	Centre for Advanced Engineering KPI's	14	<b>10</b>	<b>Appendices</b>	<b>32</b>
4.4	Research Partner KPI's and Collection Methodology	14			
4.4.1	EQR	14			
4.4.2	SCIRT	14			
4.4.3	Arrow International	15			
4.4.4	Naylor Love	15			
4.5	Frequency of Data Collection	16			
<b>5</b>	<b>Project Data Assessment</b>	<b>17</b>			
5.1	EQR performance data	17			
5.2	SCIRT performance data	17			
5.2.1	Safety	17			
5.2.2	Time	18			

## **Table of Contents**

### **Table of References**

Table 2.1 Methodology Data Objectives vs. Actual Data Collection.....	6
Table 3.1 Alliance Leadership Team organisations.....	10
Table 4.1 CAENZ Performance Measures 2006 .....	14
Table 4.2 SCIRT performance measures .....	15
Table 4.3 Arrow International Performance Measures .....	15
Table 4.4 Naylor Love Performance Measures .....	16
Table 5.1 Arrow Internationals Residential Performance Data - Time Predictability .....	25
Table 5.2 Arrow Internationals Residential Performance Data – Cost Predictability & Quality .....	25
Table 5.3 Arrow Internationals Commercial Performance Data - Time & Satisfaction.....	26
Table 5.4 Arrow Internationals Cost & Quality Performance Data.....	26
Table 5.5 Naylor Love Fully Measured Projects .....	26
Table 5.6 Naylor Love Project Performance .....	27
Table 5.7 Naylor Love 22 Projects with limited performance measurement .....	28

### **Table of Figures**

Figure 2-1 Productivity Partnership Work Streams and Work Stream Leaders.....	4
Figure 3-1 EQR Repairs Process .....	9
Figure 3-2 SCIRT Alliance Structure (indicative).....	10
Figure 4-1 Strong Performance reliant on four important components ....	12
Figure 5-1 SCIRT Safety Performance (to July '12) (KRA Safety is sum of all 3 KPI's).....	22
Figure 5-2 SCIRT Value for Money (to July '12).....	22

Figure 5-3 SCIRT Our Team Performance (to July '12) .....	23
Figure 5-4 SCIRT Customer Satisfaction Performance (to July '12) .....	23
Figure 5-5 SCIRT Environmental Performance (to July '12).....	24

## 1 EXECUTIVE SUMMARY

The construction sector, as a contributor of almost 50% of all gross fixed capital formation, is a key driver in the New Zealand economy (Rice & Shewan, 2011). Yet the construction industry suffers from low productivity and is subject to significant volatility, which has an impact on skills retention and low labour productivity growth.

The New Zealand construction industry has commissioned a significant number of reports<sup>1</sup> which look to quantify this problem through research. Though this research is critical, there appears to have been little research undertaken to address the cultural and mechanistic change that is needed to address these documented problems. By shifting research focus from problem identification to problem solving, greater value based output may be gained, allowing for the development of new processes, tools, innovations and greater performance within the construction sector (Berry & ProductivityPartnership, February 2011).

The Building and Construction Sector Productivity Partnership was established in November 2010 to actively address the issue of low productivity in the sector. It forms a strong partnership between industry, Government, and research organisations being established through the Department of Building and Housing (now Building & Housing Group within the Ministry of Business, Innovation and Employment [MBIE]) .

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<sup>1</sup> Refer to Appendix A in the 'Building and Construction Productivity Research Stocktake' report completed by the Productivity Partnership in February 2011 (available at [www.buildingvalue.co.nz/evidence-workstream-projects](http://www.buildingvalue.co.nz/evidence-workstream-projects))

The Evidence Working Group, one of four work streams within the Productivity Partnership, has identified opportunities in Canterbury to undertake important research on productivity, and to pilot performance measures. The development and analysis of Key Performance Indicators KPI's is seen as a key research aim, providing evidenced based performance data across the sector.

The Evidence Working Group has commissioned BRANZ, the University of Auckland and Constructing Excellence NZ (the research team) to undertake this study. The research team was tasked with engaging directly with industry to understand, collect and interpret performance data, and highlight any challenges or success factors that could influence performance in the mid to long term.

The research team identified four organisations (research participants) that will support the research project. The organisations include:

1. Earthquake Recovery (EQR)
2. Stronger Christchurch Infrastructure Rebuild Team (SCIRT)
3. Arrow International (PMO for Southern Response)
4. Naylor Love

Each organisation is measuring performance in different ways, but ultimately collecting Key Performance Indicators (KPI's).

In working with the research participants, it has become clear that commercially sensitive information has both delayed and limited the extent of data that has been released. For example, the research team is currently working with EQR to overcome issues relating to commercially sensitive data that has prevented the release of data at this early stage. It

is understood that this information will be made available in Jan/Feb 2013, and can be analysed in subsequent research reports.

Of the remaining three research participants, the data received has allowed for discussion, and will form the baseline for further data that each of the research participants has committed to providing. Additional data will provide an opportunity to understand performance trends, and allow a detailed assessment of several unique performance measures.

In reviewing the performance data provided by Arrow International and Naylor Love, it can be seen that the national benchmarking performance measures published by the Centre for Advanced Engineering NZ (in 2006) are still in use. SCIRT has adopted a unique set of performance measures, not uncommon for Alliance partnerships.

Of the 12 KPI's being measured by SCIRT, the following two KPI's will be closely observed with interest, as they are seen to underpin the fundamental philosophy behind the Productivity Partnership. That is to generate innovation, and develop a more skilled and knowledgeable workforce that remains in New Zealand long after the Alliance contract has ended, thus working towards the Productivity Partnership's goal of achieving 20% improvement in productivity by 2020.

1. **Innovations:** Innovations created then used by SCIRT, captured in the value register. (Innovation defined a feature of system, operation or built work that gives better performance at the same cost or the same performance at less cost);
2. **Ownership of a skilled Workforce:** Number of operatives engaged in NZQA Qualifications (including SCIRT version) as a % of SCIRT field team members.

In working with each of the research participants over the past six months, it is clear that an area of continued focus will be to breakdown the commercially sensitive issues that have obstructed data harvesting, and to obtain additional performance data which can be of benefit to the industry. Importantly, greater attention on the processes and strategies put in place to address poor performance will be key to understanding what approaches deliver positive results.

Each organisation is working against challenging programmes as part of the Canterbury Rebuild, particularly EQR and SCIRT who have had the added pressure of establishing a new organisational structure and culture from scratch. The research team will continue to work with its research participants, and look for opportunities to encourage more regular communication and data provision.

After reviewing the performance data provided at this early stage, there appears to be little opportunity to directly compare performance data across each of the four research participants. Focus should instead be on developing a set of KPI's that are shown to deliver reliable and measurable results for each research partner, and develop a revised performance management data set for New Zealand's construction industry based on robust measures that are proven to work.

During the data collection process, two of the four research participants wanted to understand how benchmarking would be achieved in the mid to long term. Without a stable and independent custodian or organisation maintaining a national performance data base, there are concerns that long term measurement and benchmarking will be difficult.

Furthermore, greater encouragement or incentive needs to be given to junior & senior staff (typically responsible for maintaining performance measures). There is evidence that some KPI's have failed to get the necessary attention outside Senior Management reporting periods (six monthly).

The benefit of having a dedicated Best Practice Manager (as with Naylor Love) was clear. Organisations who wish to champion performance measurement as an effective management tool should consider establishing a Best Practice Manager role within their organisation.

It is recommended that the research team continue working with its four research participants, and collect performance data that can be assessed and delivered in subsequent reports.

The report also recommends that the Productivity Partnership, along with its partners, give consideration to the type and form of national body or partnership that can maintain collection and reporting of performance data to the industry. This will provide the platform for setting best practice and allowing project leaders to benchmark project progress against national leaders.

## 2 INTRODUCTION

The construction sector, as a contributor of almost 50% of all gross fixed capital formation, is a key driver in the New Zealand economy (Rice & Shewan, 2011). Yet the construction industry suffers from low productivity and is subject to significant volatility, which has an impact on skills retention and low labour productivity growth. A study was commissioned by the Building Research Association New Zealand [BRANZ] in November 2008, attempting to understand why its sector was prone to such boom and bust cycles. It concluded internal system factors, such as poor communication within the supply chain, poor visibility of long term strategic planning, delays within the procurement system and the manipulation of the industry by policy makers contributed to this volatility. (Allan, Yin, & Scheepbouwer, 2008).

BRANZ has produced several reports that attempt to understand low productivity within the construction sector, as have the Centre for Advanced Engineering New Zealand, the University of Auckland, Constructing Excellence NZ, the Department for Building and Housing, and Motu Economic and Public Policy Research.

Much like the United Kingdom between the Simpson Report in 1944 and the Egan Report in 1998, the New Zealand construction industry has commissioned reports which look to quantify the problem<sup>2</sup>. Though this research is critical, there appears to have been little research undertaken to address the cultural and mechanistic change that is needed to address

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<sup>2</sup> Refer to Appendix A in the 'Building and Construction Productivity Research Stocktake' report completed by the Productivity Partnership in February 2011 (available at [www.buildingvalue.co.nz/evidence-workstream-projects](http://www.buildingvalue.co.nz/evidence-workstream-projects))



these well documented problems. By shifting research focus from problem identification to problem solving, greater value based output may be yielded, allowing for the development of new processes, tools, innovations and greater performance within the construction sector (Berry & ProductivityPartnership, February 2011).

## 2.1 Productivity Partnership

The Building and Construction Sector Productivity Partnership was established in November 2010 to actively address the issue of low productivity in the sector. It forms a strong partnership between industry, research organisations and Government, being established through the Department of Building and Housing.

The partnership is seeking to build value within each step of the construction process, and is targeting four key areas or 'work streams' for developing performance within the construction sector.

### 1. Skills

The skills works stream is focussed on developing and maintaining a highly skilled and effective work force that can address the needs of a developing New Zealand.

### 2. Evidence

The Evidence work stream has the responsibility of collecting, analysing and sharing robust data that allows industry performance to be measured and understood empirically. This will provide greater confidence when setting industry targets, strategic direction and broader construction policies.

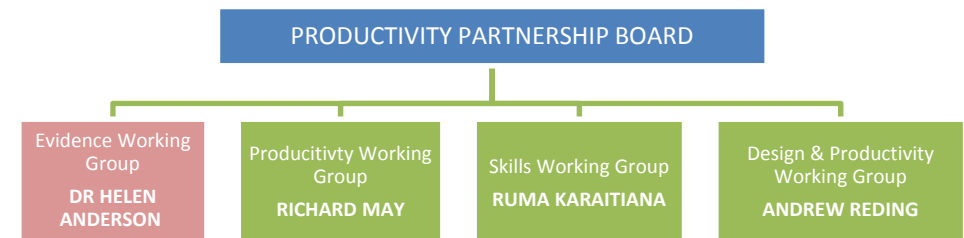
### 3. Procurement

Understanding the key role of procurement within the construction sector, this work stream will seek to illuminate the benefits of greater strategic and relationship based procurement approaches.

### 4. Construction Systems

Technology has had a profound impact on the construction sector over the past thirty years. This work stream will look to encourage the application of new and existing technological systems (i.e. BIM), encouraging greater knowledge transfer, efficient and effective design process management and whole of life/value based decisions.

## 2.2 Evidence Work Stream



**Figure 2-1** Productivity Partnership Work Streams and Work Stream Leaders

The Evidence Working Group, chaired by Dr Helen Anderson (Figure 2-1) has identified opportunities in Canterbury to undertake important research on productivity, and to pilot Key Performance Indicators [KPI's].

The development and analysis of KPI's is seen as a key research aim, providing evidenced based performance data across the sector.

The New Zealand Centre for Advanced Engineering New Zealand (CAENZ) suggested in 2006 that the construction industry suffered a lack of quality, a national skills shortage and inconsistent performance (CAENZ, 2006). Importantly, CAENZ claimed that each of these issues was 'anecdotal', as New Zealand did not have a formal methodology to measure performance.

The collection and analysis of KPI data within the Construction sector is intended to be the catalyst for developing a comprehensive framework that allows the industry to measure its performance using best practice principals.

The Evidence Working Group has commissioned BRANZ, the University of Auckland and Constructing Excellence NZ (the research team) to undertake this research. The research team was tasked with engaging directly with industry to understand, collect and interpret performance data, and highlight any challenges or success factors that could influence productivity in the mid to long term.

### 2.3 Project Methodology

This section outlines the methodology adopted by the Productivity Partnership, and discusses the challenges/opportunities encountered by the research team in delivering against this methodology.

#### Stage 1 - Identify & secure suitable building projects for the pilot study

The first stage was to identify 24 sample projects in Canterbury, and was broken into the following four categories.

- 1) 6 residential builds
- 2) 6 commercial warehouse style
- 3) 6 commercial business
- 4) 6 infrastructure projects

Research Team Commentary: At an early point in the project, the research team reviewed the four categories above, and proposed that the same number of projects be secured but with more focus on residential rebuild and repair. This was in response to the scale of residential construction taking place as part of the Canterbury Rebuild effort, and the opportunity to capture significant data over several years.

This approach was approved, leading to the adoption of the following four categories.

- 1) Residential New Build
- 2) Residential Repair
- 3) Commercial
- 4) Horizontal Infrastructure

The research team has engaged four organisations covering each of the categories above, and has exceeded 24 projects. This is discussed further in section 5.

## Stage 2 - Data collection & survey compilation

Following project identification, the methodology specified participant survey, and capturing project data. Data collection should focus on:

- Type and size of project
- Type of project management used
- Type of procurement used
- Whether clients have skills in, or sought advice on procurement
- Source(s) of information used to inform process
- Use of prefab components or buildings
- Attitude to prefab
- Defect levels
- Customer satisfaction
- Delivery times (stages and complete project)
- Cost
- Product quality
- Client satisfaction
- Experience with regulatory system

**Research Team Commentary:** It became apparent that each participant was collecting different types of performance data, and some more comprehensive than others. The frequency of data collection was irregular also, owing mostly to the intensity of reactive work in Canterbury. The research team had also engaged the four research participants at a time when they were still mobilising their resources and bedding in many of the processes required to deliver their output (incl. performance management). Table 2.1 outlines the actual data collected to September 2012.

Methodology Data Objectives	Actual Data Collection
Type and size of project	Yes
Type of project management used	Yes
Type of procurement used	Yes
Whether clients have skills in, or sought advice on procurement	TBC
Source(s) of information used to inform process	Yes
Use of prefab components or buildings	TBC
Attitude to prefab	TBC
Defect levels	Yes
Customer satisfaction	Yes
Delivery times (stages and complete project)	Yes
Cost	Yes
Product quality	Yes
Client satisfaction	Yes
Experience with regulatory system	TBC

**Table 2.1** Methodology Data Objectives vs. Actual Data Collection

The research team shall be sitting with each of the research participants in January/February 2013 to understand their views on prefabrication, the regulatory system and their approach to procurement. This will be achieved through a survey, focussing on the following indicators, some of which have already been collected:

- Delivery team characteristics (team, size, structure, target area of work, e.g. residential, commercial, horizontal infrastructure etc)
- Current use of KPI's
- Use of standardised designs and processes
- Time predictability to delivery of design (forecast and actual)

- Cost predictability to delivery of design (forecast and actual)
- Use of prefab components or buildings and/or off-site manufacture
- Source(s) of information used to inform process and practice
- Time predictability to delivery for construction (forecast and actual)
- Cost predictability to delivery for construction (forecast and actual)
- Experience with regulatory system (time, costs)
- Efficiency (e.g. Cost per area delivered)
- Profitability
- Productivity
- Health & Safety (Accident rate)
- Skill levels of workers
- Use and successfulness of onsite and offsite training
- How the indicators data being collected matches with data collected by the delivery teams for their internal business purposes.

### Stage 3- Data Analyses

Information from the survey and data collection will be analysed at project, firm and sector levels to determine:

- What each indicator is actually telling us (a priori and post hoc analysis of indicators)
- What the minimum effective set of indicators is
  - Which if any indicators duplicate information gained from other indicators?

- At what point does adding indicators result in no measurable improvement in the information collected (redundancy)?
  - Any gaps in the indicator set?
- Ease of collection of indicator data (was it readily available or did the client or delivery team have to rework or aggregate data to get the indicator data?)
- Expectations of clients and delivery teams for feedback and ability to measure productivity indicators (from this pilot, and on-going)

Research Team Commentary: The research team has undertaken analysis on the data provided by the research participants, and provided commentary in this report. Additional data collection and continued communication with research participants will build on these initial conclusions.

### Stage 4 Outputs

The key outputs will be a report documenting:

- the indicators trialled
  - what they were designed to measure
  - what they actually measured
  - Ease of data collection
  - Repeatability of data collection
- Key findings at firm, project and sector level
- Recommendations for core sets of indicators at each level (project, firm, sector)

- Recommendations for delivering KPI information to delivery teams and clients
- Comparison with other key KPI processes domestically and off-shore (including Statistics NZ datasets, NZ and UK Constructing Excellence, CAENZ, Resilient Organisations and other sectors [e.g. dairy])
- Summary fact sheet for feedback to stakeholders

**Research Team Commentary:** The outputs above are broadly contained within this report, and are based upon the information collected to date. This report contains baseline data that will be supported by additional data collection and commentary as the research team continue working with its research participants. The above points will be fully addressed in subsequent reports, once larger data sets and participant surveys have been undertaken.

### 3 RESEARCH PARTICIPANTS

The four Research Participants are:

- Earthquake Recovery (EQR)
- Stronger Christchurch Infrastructure Rebuild Team (SCIRT)
- Arrow International
- Naylor Love

Each organisation was interviewed as part of the Productivity Partnerships 'The Canterbury Procurement Project' report issued in 2012, and all were willing to provide performance data for research purposes.

The following sections provide a brief summary of their role in Christchurch.

#### 3.1 Earthquake Recovery (EQR)

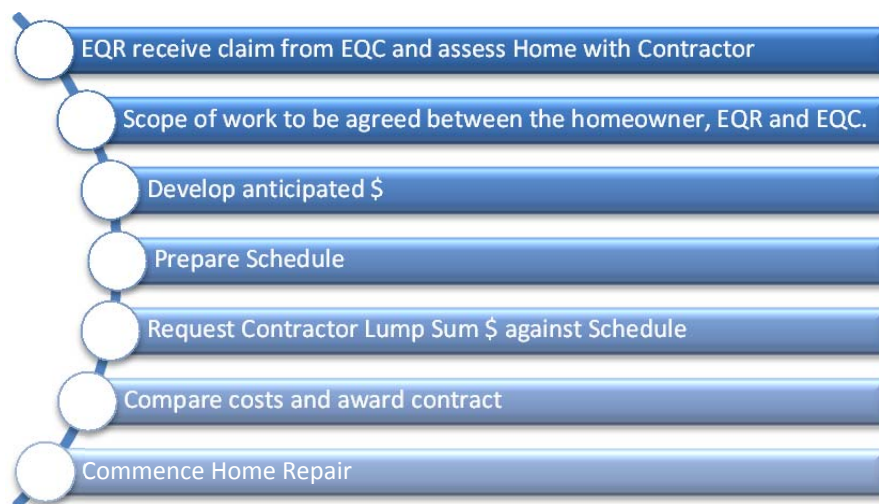
Following the September 2010 earthquake, the Earthquake Commission (EQC) engaged Fletcher Construction to run a Project Management Office (PMO). This new business is called Earthquake Recovery (EQR) and is responsible for managing insurance claims processed by EQC. The following points were highlighted in a meeting on the 14<sup>th</sup> February 2012:

- EQR was established to project manage the repair of homes damaged in the earthquakes
- EQR has approximately 100,000 claims to process, ranging from \$10k to \$100,000
- EQR has approximately 500 staff working within its business
- The typical claim is around \$25/30k (6 weeks per contract)

- EQR has a central office in Christchurch, and a total of 21 hubs across the Canterbury Region
- EQR operates under a \$50M/month cash flow
- 60% of EQR's jobs are what they call 'Scrape & Paint'
- The anticipated scope extent is approximately \$3.6 Billion

EQR is responsible for commissioning and managing all head contractors and suppliers/trades, all of which must comply with an accreditation process.

Repair work is allocated to contractors using the following process –



**Figure 3-1** EQR Repairs Process

EQR are currently working to complete 80% of all home repairs by the end of 2014. This initial target is dependent on the number and magnitude of aftershocks or further earthquakes and the availability of qualified and accredited contractors and suppliers.

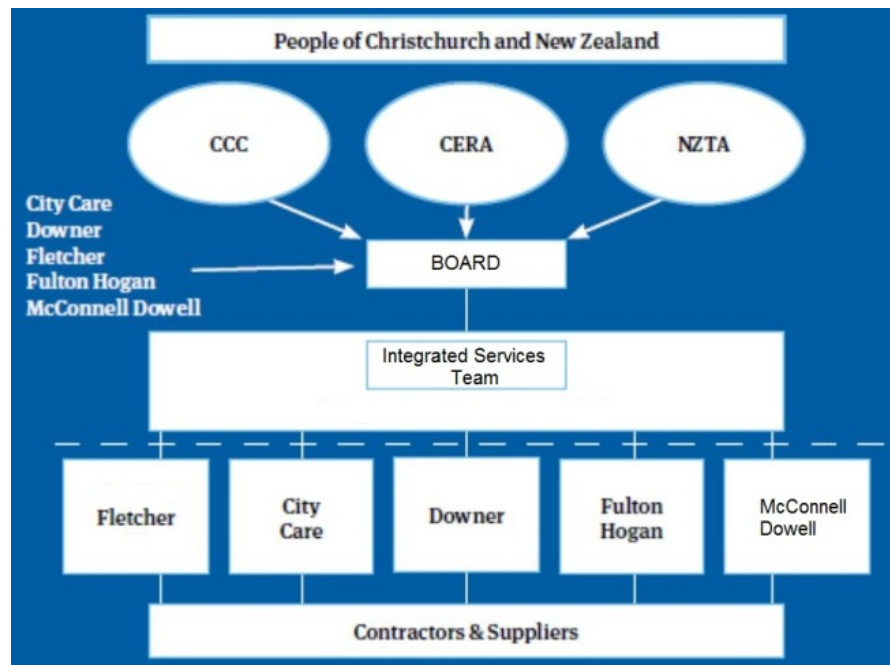
EQR will be submitting performance data for the Residential Repairs category, outlined in section 2.3.

### 3.2 Stronger Christchurch Infrastructure Rebuild Team (SCIRT)

Like EQR, the Stronger Christchurch Infrastructure Rebuild Team (SCIRT) is an organisation that was formed shortly after the earthquake in Canterbury. SCIRT is responsible for rebuilding horizontal infrastructure, such as roads, retaining walls, footbridges, stormwater conveyance/discharge networks, fresh water supply networks and wastewater treatment systems.

SCIRT is an Alliance, comprising a number of different contractors and clients, as shown in Figure 3-2 below.





**Figure 3-2** SCIRT Alliance Structure (indicative)

The Alliance Leadership Team (ALT) is made up of representatives from the three Client organisations (or owning organisations) as well as the five private (non-owning organisations)

Owning Organisations	Non-owing Organisations
Christchurch City Council	MacDonnell Dowell
NZTA	Downer
CERA	City Care
	Fulton Hogan
	Fletcher

**Table 3.1** Alliance Leadership Team organisations

SCIRT are rebuilding to the same standard as the existing network, though will be looking for opportunities to use modern materials and advanced design approaches to yield improvements where possible. They are looking to embrace innovation throughout the design and construction processes.

SCIRT has agreed to contribute infrastructure project data throughout its contract, which is expected to total approximately \$2Billion.

### 3.3 Arrow International (PMO to Southern Response)

Arrow International has 10 offices or branches in New Zealand, including an office in Christchurch. They have seen their office numbers increase from 40 (pre-earthquake), to almost 200 members of staff now based in their Christchurch office. Arrow International will be relocating to a new office in September 2012 due to the significant damage to their current building.

Arrow International has been commissioned by Southern Response to manage its earthquake insurance portfolio. Like EQR, Arrow International is a PMO, but only manages claims which are above \$100k. EQC cover the first \$100k of repair work (managed by EQR), with Southern Response covering anything above that \$100k capping.

Arrow International has approximately 120 people working on Christchurch Rebuild/Repair projects as part of their PMO scope of work, which includes approximately 7,000 claims.

Arrow International will be providing both Residential Repair/Rebuild and Commercial data for this research project.

### 3.4 Naylor Love

Naylor Love is one of the largest construction companies in New Zealand, and has six offices nationwide, including Christchurch. Naylor Love specialises in the construction of commercial buildings, including accommodation, education, leisure and retail.

The Christchurch office has grown by more than 60 since the earthquake, bringing it to a total of 75 (38 of which are office based). Their office was not significantly damaged in the earthquake, though they will be required to relocate to larger premises to accommodate the increasing resource demand.

Following the earthquake, Naylor Love has been involved in a number of projects, typically focusing on:

- Demolition of damaged buildings
- Stabilisation and strengthening of a number of heritage buildings
- Strengthening to a large number of modern commercial buildings
- Construction of new buildings

In 2005/06 Naylor Love created a new role within its business to collect performance data at a project level. This was in line with the national benchmarking initiative developed in 2006, and published by CAENZ. After seven years, Naylor Love continues to support the benchmarking initiative through a Best Practice Coordinator, who is based in Christchurch.

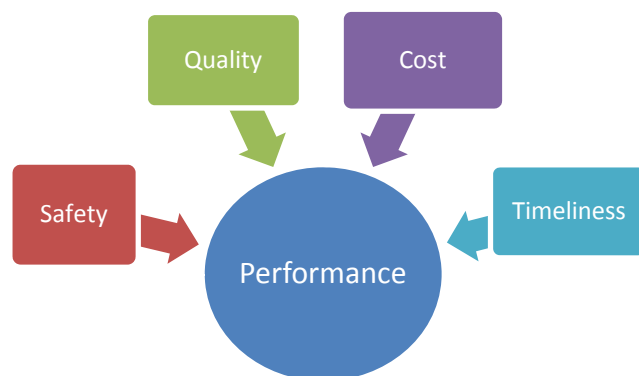
The Best Practice Coordinator manages project performance for all New Zealand projects, and has provided specific support to this research project for all earthquake related commissions. Naylor Love will provide

Commercial project data as part of this research project, which has been presented in Appendix C.



## 4 PERFORMANCE MEASUREMENT

The purpose of this section is to introduce and define many of the terms and tools that are used to manage performance. It will also introduce and discuss the key difference between Key Result Indicators (KRI's) and Key Performance Indicators (KPI's), as well as take a closer look at how each of the four Research Participants monitor performance as part of the Canterbury Rebuild effort.



**Figure 4-1** Strong Performance reliant on four important components

Performance management typically focuses on four aspects of the construction process. These include cost, safety, timeliness and quality, all of which have a significant impact on construction productivity.

As we work with EQR, SCIRT, Arrow International and Naylor Love over the coming months, we shall be looking to monitor their performance across each of these four areas. For the NZ construction sector to improve productivity by 20% in 2020, it must focus on each of these key areas.

### 4.1 KRI'S and KPI's

Key Result Indicators and Key Performance Indicators are two familiar terms in performance management, though are often used interchangeably, and typically applied by organisations in very different ways. Peter Parmenter best describes this in 'Key Performance Indicators – Developing, Implementing and using Winning KPI's' when suggesting

*'Many companies are working with the wrong measures, many of which are incorrectly termed key performance indicators (KPI's). Very few organisations really monitor their true KPI's. The reason is that very few organisations, business leaders, writers, accountants and consultants have explored what a KPI actually is.'*(Parmenter, 2010)

For the benefit of this report, both are briefly described below:

- **Key Result Indicators (KRI's)** are used to understand how a project or organisation has done in a key area. Measures such as customer satisfaction and profitability are good examples of a KRI, as they summarise how successful a particular project has been.
- **Key Performance Indicators (KPI's)** drive improvement, they tell us what a project manager or organisation must do to achieve a successful outcome. An example of a KPI might be how many times a site is to be inspected each week, or an employee's weekly utilisation.

The difference between these two terms is important in that it allows management to differentiate between reporting and driving performance. Their distinction needs to be better understood, and applied correctly when setting performance measures. Of the four

research participants who are participating in this research project, only one is using both KRI's and KPI's.

If performance management/measurement is to be embraced by the NZ Construction industry, it is important that the terminology or assessment framework is well understood.

#### 4.2 Best Practice and Benchmarking

In the United Kingdom, the Egan Report in 1998 (*Rethinking Construction*) did much to drive efficiency improvements in the UK construction industry (Jones, Savage, & Westgate, 2003).

The Egan Report reinforced a recommendation of the Construction Industry Boards 'Towards a 30% Productivity Improvement in Construction' document, developed by Sir Michael Latham following his 1994 report (Constructing the Team). Importantly, it highlighted the importance of collating industry best practice behaviours that could be used by organisations to orientate their performance against others within the construction sector.

*'Our experience tells us that ambitious targets and effective measurement of performance are essential to deliver improvement. We have proposed a series of targets for annual improvement and we would like to see more extensive use of performance data by the industry to inform its clients' (Egan, 1998).*

In 2006, the New Zealand Construction Industry Council defined Best Practice as *'the policy, systems, processes and procedures that, at any given point in time, are generally regarded by peers as the practice that*

*delivers the optimal outcome, such that they are worthy of adoption.* (NewZealandConstructionIndustryCouncil, 2006)'.

The UK has been collecting performance data since 1998, and using this data to identify results that represent the highest levels of performance. These high performing results are used by project managers and organisations to compare their own KRI/KPI results against industry best practice, a process called benchmarking. In doing this, individual project managers and organisations can quickly identify where they are losing pace with industry, and put in place measures to mitigate further under performance.

Benefits of benchmarking include:

1. Organisations can identify areas of underperformance, allowing for a specific and targeted approach to mitigating deficiencies.
2. Clients can use best practice principles to secure best value when procuring professional services or physical works contracts, allowing for greater distinction between 'Price' and 'Cost'.
3. Allows the construction industry to quantify areas of poor performance, leading to meaningful and value-centric action, such as up-skilling, policy change, new Health and Safety legislation, or procurement approaches.
4. Allows the construction industry to baseline performance, and accurately measure improvements from that baseline.
5. Allows the industry to trial new innovations, and measure their success against traditional forms of construction (such as Pre-fabrication, BIM, partnering etc...)

#### 4.3 Centre for Advanced Engineering KPI's

New Zealand established a set of national performance measures in 2006, through the work of the CAENZ and others. It developed a number of performance measures, including:

KRI	1. Satisfaction	2. Cost
KPI	Client Satisfaction Service Contractor	Predictability Design Costs
	Use Again	Predictability Construction Costs
	Value for Money	Predictability Project Costs
KRI	3. Quality	4. Time
KPI	Client Satisfaction Product	Predictability Design Time
	Defects on Handover	Predictability Construction Time
	Defects Clearance	Predictability Time
KRI	5. Safety	6. Profitability
KPI	Safety Accidents	Predictability Project Margin

**Table 4.1** CAENZ Performance Measures 2006

As can be seen from Table 4.1, the four key components of performance are addressed in cost, quality, timeliness and safety. Two additional areas are also included, satisfaction and profitability.

In reviewing future performance measures, it will be interesting to understand the relationship between client satisfaction, and the four key performance components. In doing this, we can determine if high scoring

client satisfaction results are heavily based on a combination of positive cost, quality, time and safety results.

Profitability is an important performance measure, as it offers some insight into the supply chains ability to maintain high performance. It is not uncommon for Contractors and Consultants to reduce their tendered price to win projects, though this practice is not sustainable, and will ultimately fail to deliver on long term strategic growth, skills retention and quality of work. Unfortunately, profitability will not be initially considered as part of this report, due to commercial sensitivities.

#### 4.4 Research Partner KPI's and Collection Methodology

This section will identify the number and type of KPI's being adopted by EQR, SCIRT, Arrow International and Naylor Love. Each organisation has different approaches to performance management, making data collection and analysis difficult, but this variation can also uncover unique and innovative techniques.

##### 4.4.1 EQR

The research team is currently working with EQR to overcome issues relating to commercially sensitive data. It is hoped that this information will be made available in January/February 2013, where the data can be analysed for subsequent reports.

##### 4.4.2 SCIRT

SCIRT has developed a unique series of performance measures (see Appendix A), which record KRI's and KPI's. SCIRT is an Alliance, and in adopting the Alliance model has a portion of fee set aside to reward high performance. These are stipulated in Table 4.2, along with performance

weighting. Weighting is used to identify the level of importance placed on each performance measure, and to determine the financial reward to be released.

Key Result Indicator	Key Performance Indicator
Safety – 0% weighting	Safety Engagement - awareness
	Safety Initiatives - Action
Value – 35% weighting	Productivity Gains
	Quality
	Innovations
Our Team – 20% weighting	Alignment & Team Involvement
	Health Wellbeing
	Ownership of a skilled workforce
Customer Satisfaction – 30% weighting	Satisfaction Product
	Satisfaction with Communication
Environmental – 15% weighting	Construction
	Waste Minimisation

**Table 4.2** SCIRT performance measures

In reviewing SCIRT's performance measures, a number of interesting points can be seen, such as developing their performance measures to reinforce the strong team culture and customer focused objectives, common in Alliance frameworks. Innovation is a performance driver, as is training and up-skilling under the ownership of a skilled workforce KPI.

Safety has not been given a weighting, underlining the importance of a zero harm culture that is not to be incentivised, but seen as a basic expectation of each Alliance member.

SCIRT has developed a comprehensive table of performance measures, including methods of measurement and target setting. This can be seen in Appendix A, and is discussed further in section 5.2.

#### 4.4.3 Arrow International

Arrow International uses the national performance measures introduced in 2006 by CAENZ. They use these performance measures (see Appendix B) on both residential rebuild/repair projects (as part of their PMO commission with Southern Response), and their commercial projects.

<b>Client Satisfaction</b>	with product
	with service
	use again
<b>Defects (Quality)</b>	cleared within 15 days
<b>Safety</b>	safety accidents
<b>Cost</b>	predictability of construction cost
<b>Time</b>	predictability of construction time

**Table 4.3** Arrow International Performance Measures

As can be seen from Table 4.3, Arrow International record KRI's, which are collected at the end of each project phase. As discussed in section 4.1, KRI's allow review of performance, unlike KPIs which drive performance. This will be an area of focus as the research team try to identify opportunities to both drive and report on performance.

#### 4.4.4 Naylor Love

Naylor Love uses the national performance measures introduced in 2006 by CAENZ. These are outlined in Table 4.4 below (and can be seen in Appendix C).

<b>Client Satisfaction</b>	with product
	with service
	use again
<b>Defects (Quality)</b>	impact on handover
	cleared within 15 days
<b>Safety</b>	safety accidents
<b>Cost</b>	predictability of construction cost
	client perception – cost
<b>Time</b>	predictability of construction time
	client perception - time

**Table 4.4** Naylor Love Performance Measures

Naylor Love worked with Constructing Excellence NZ in 2006 to up skill a member of its team, enabling them to track and measure performance. Initially, they were benchmarking against the New Zealand national data set, though lack of maintenance meant this data set quickly lost relevance. Naylor Love has continued collecting data since 2006, and collates all data at the end of the financial year.

Naylor Love also record client perception (time) and client perception (cost), which goes beyond the measures established in 2006. Naylor Love believes this information, obtained by interview, gives them greater insight to the expectations of their clients.

#### 4.5 Frequency of Data Collection

The frequency of collection often varies, and can be dependent on workload, project programme, time of year or specific demands from Senior Management. Data collection is not undertaken routinely, leading to reactive data collection and gaps in performance data.

Naylor Love gathers performance data during the year, though most of the data collection is undertaken by the Best Practice Manager at the end of the financial year. Performance is used to inform Senior Management of construction performance at the end of every year, allowing Directors to understand areas of weakness and set new targets for the coming year. Similarly, Arrow International appears to be collecting data through the year, with a bigger push toward the end of the financial year.

SCIRTS's performance measures have only recently been approved for use, though historic data (discussed in section 5.2) indicates a tendency to collect data and drive performance at or in the lead up to a Senior Management reporting period.

EQR report to their Board on a monthly basis, so it is assumed (in the absence of any data) that they collect and report on performance on a monthly basis. This will be confirmed once data has been made available.

## 5 PROJECT DATA ASSESSMENT

This section outlines the performance management approach taken by each organisation, as well as some of the challenges that have limited the supply of data at this early stage of the research project. Additional discussion on SCIRT's performance measures is offered, as they offer significant difference to the national performance measures established by the CAENZ in 2006, so will not be familiar to most industry members.

### 5.1 EQR performance data

Though EQR has not been in a position to provide performance data at this stage, the research team is confident that following further discussion, data will become available for analysis and reporting.

After discussions with EQR, and following review of their forward workload, it is unlikely they will be able to provide performance data at project level. As stated in section 3.1, EQR has approximately 100,000 claims to manage, with 60% of their projects being 'scrape and paint'. Analysing performance for each claim is considered unrealistic, from both a data collection and data analysis perspective. It is also questionable if this level of scrutiny would yield any valuable or representative outcomes.

It may be better to adopt EQR's management approach, where they have split the 100,000 claims into two categories for setting objectives, and reporting against those objectives. This is currently done by understanding claims to be either <\$50k or >\$50k. A number of assumptions would need to be made if this approach was followed, but it

would simplify data collection as this is currently how EQR is measuring certain performance criteria.

Alternatively, it may be possible to understand the 100,000 claims as comprising of 21 projects, assuming each of the 21 hubs established around Canterbury to be a project. This would allow the research team to understand how the hubs (who broadly have the same type of claims to process) perform against each other, and highlight how better performing hubs differentiate themselves in closing out claims.

The merits of both approaches will form the basis for continued discussion with EQR, though early indications from EQR suggest a preference for the 21 hub/project approach.

### 5.2 SCIRT performance data

SCIRT's performance measures have only recently (late July '12) been ratified by the Alliance Board, and it is clear that the resulting measures stand apart from the national performance measures developed in 2006. The following sections highlight some of the key measures being recorded by SCIRT, and how they differ from traditional metrics.

#### 5.2.1 Safety

Where traditionally safety is measured in Lost Time Injury (LTI), SCIRT have chosen to measure 'Safety Engagement - Awareness' and 'Safety Initiatives Action'. The measures are defined as follows:

Measure of Safety Engagement – Awareness (70% KPI weight)



- Combined no. of recorded safety conversations + no of Near Miss & Hazard reports (measured per 1,000 person hrs.) 40% weight
- Safety Audits (measured per 1,000 person hrs.) 30% weight

#### Safety Initiative – Action (30% KPI weight)

- Combined no. of Safety Initiatives (unprompted action taken to improve safety) and satisfactory close-outs (incl. passing on lessons learned) of the above engagement. (measured per 1,000 person hrs.)

Three targets have been defined by the Alliance:

1. MCOS (Minimum Conditions of Satisfaction) – 5 engagements
2. Stretch – 15 engagements
3. Outstanding – 25 targets

The approach taken by SCIRT has the advantage of proactively managing safety rather than reporting on it. By managing safety performance at an individual level (from the ground up), you can drive and adapt a safety culture that will directly impact the annual LTI calculation. Further review of this approach and how it influences LTI reporting will be undertaken as SCIRT roll out their KPI's.

#### 5.2.2 Time

One of SCIRT's five KRI's is Value, which in itself is a performance measure not specifically defined in the national performance measures developed in 2006.

In reviewing all of the KPI's provided by SCIRT, only one specifically deals with time, and is shown below. Though SCIRT use the term 'Productivity', it makes more sense to understand it as a measure of time.

#### Productivity gains (40% KPI weighting)

- A small number of measures are nominated in the Target Out-turn Cost (TOC) such as the length of pipe laid and completed per month per project. The measure will be expressed as a percentage of the TOC rate for each measure.

Three targets have been defined for the contractor:

1. MCOS (Minimum Conditions of Satisfaction) – As TOC rates
2. Stretch – 103% of TOC rates
3. Outstanding – 105% of TOC rates

To put this in context, if the Contractor lays 100m of pipe in 1 month as per the TOC rate (example), the MCOS has been achieved. Anything above 100m and under 105m warrants a stretch target, with >104m regarded as outstanding.

Traditionally, this would be measured as 'predictability of construction time', where the following calculation is used:

- A. Determine anticipated construction duration
  - B. Determine the actual construction duration
- Calculate the % difference as follows

$$\text{Predictability of construction time (\%)} = \frac{B-A}{A} \times 100$$

A negative % means the project was completed faster than originally anticipated, so a good performer. In SCIRT's case they are measuring performance as a rate against the TOC, so a positive % is seen as favourable.

### 5.2.3 Quality (30% KPI weighting)

SCIRT promote two forms of measurement to assess quality:

- Project Design Review (15% weighting): A project performance scoring system that measures satisfaction with the concept and detailed design as judged by designers and estimators, closely modelled on the NZTA designer scoring system.
- Project Construction Review (15% weighting): A delivery project scoring system similar to the preceding designs and incorporating Non-Conformance Reports of re-work, self-scored with coordinator review.

Three targets have been defined for the consultant/contractor:

1. MCOS (Minimum Conditions of Satisfaction) – 60%
2. Stretch – 70%
3. Outstanding – 80%

By adopting NZTA's scoring system (assumed to be the PACE form), the designer will be assessed against the following areas:

Management:

- Competency (*out of 10*)
- Creating 'No Surprises' Environment (*out of 5*)
- Creating Innovation (*out of 5*)

- Proactiveness (*out of 5*)
- Responsiveness (*out of 5*)

Production

- Timely Outputs (*out of 15*)
- Accurate Outputs to required standard (*out of 15*)
- Defect Management System (*out of 10*)

Health & Safety

- Safe Work Practices (*out of 5*)

Administration

- QA Documentation (*out of 10*)
- Monthly Report (*out of 5*)
- Financial (*out of 5*)
- Handling of Variations (*out of 5*)

The use of the PACE form is seen as a positive step to measuring the designers performance and ability to produce quality output. This approach has been used by NZTA (and its suppliers) for several years, so organisations will be familiar with its application.

Further discussion is required to understand SCIRT's approach to managing quality output for Contractors. Traditionally, this is achieved through two methods.

#### Defects – Impact on Handover

- Undertake a client survey.
- Performance measured out of 10 (10 = Defect Free, 1 = Totally defective)

#### Defects – Cleared within 15 days

- Record the number of days it takes to clear all defects following Client identification.



- Defects cleared within 15 days is deemed to have achieved target
- Target not met if defects have not been rectified within 15 days

In reviewing SCIRT's approach to maintaining a high degree of quality, it appears the approach taken will offer easily maintained metrics, though consideration should be given to undertaking these assessments during the design and construction process (where possible), so that performance is driven during the process, rather than reported at the end. Currently, these measures will be measured at the end of each process.

#### 5.2.4 Cost

Not enough is known of SCIRT's commercial/legal framework, though it is assumed the following Alliance compensation structure is in use:

- Limb 1 – Direct costs and on-site overheads
- Limb 2 – Off-site overheads and profit, (% of Limb 1 cost)
- Limb 3 – Performance payments for achievements of KRI's

If the above structure is correct, cost will be managed in Limb 1, and profit in Limb 2. With this being the case, cost is not measured as a KRI/KPI, but performance (as measured by the KRI's) may play a part in defining the pain/gain share outcome in Limb 2.

#### 5.2.5 Other KPI's of interest

SCIRT has 12 KPI's in total, which will be the focus of further discussion in subsequent reports once more performance data has been provided. Of the 12 KPI's being measured by SCIRT, the following two KPI's will be closely observed with interest, as they are seen to underpin the fundamental philosophy behind the Productivity Partnership. That is to

generate innovation, and develop a more skilled and knowledgeable workforce that remains in New Zealand long after the Alliance contract has ended, thus working toward 20% improvement by 2020.

**KPI 2.3 - Innovations (30% KPI weighting):** Innovations created then used by SCIRT, captured in the value register. (Innovation defined a feature of system, operation or built work that gives better performance at same cost of same performance at less cost):

- MCOS – 2 innovations a month
- Stretch – 3 innovations a month
- Outstanding – 5 innovations a month

**KPI 3.3 Ownership of a skilled Workforce (15% KPI weighting):** Number of operatives engaged in NZQA Qualifications (including SCIRT version) as a % of SCIRT field team members.

- MCOS – 20% Participation
- Stretch – 30% Participation
- Outstanding – 40% Participation

#### 5.3 Arrow International performance data

Arrow International collects project data as per the national performance measurement initiative developed in 2006. This covers time, cost, safety, quality and client satisfaction. The information provided is limited at this stage, due to delays in getting client approval to publish data. This relates to the residential data that Arrow International is providing as part of this study.

In relation to residential data, Arrow International has provided time, cost and quality. At the time of writing this report, Arrow International's client had not yet commissioned client satisfaction surveys or safety reporting. The research team understands this information will be made available in the coming months.

Lastly, performance targets have not been released. These are set and agreed between Arrow International and its client, and have not been made available for external use. The research team will work with Arrow International to understand if these targets can be obtained and used within the research project.

Arrow International has provided a number of commercial projects which the research team will assess as part of this project. They include,

- |                  |                               |
|------------------|-------------------------------|
| 1. Court Theatre | 2. The Palms                  |
| 3. Recall        | 4. Halls Distribution Depot   |
| 5. Land Power    | 6. Avonside Girls High School |
| 7. Kathmandu     |                               |

Arrow International will provide performance measures against each of these projects, including time, cost, safety, client satisfaction and quality. More information would have been made available at this stage, though Arrow International have been required to relocate their office (due to Earthquake damage), which has delayed information transfer. Additional data is expected in Dec 2012/Jan 2013.

#### 5.4 Naylor Love performance data

Naylor Love collects data in line with the national performance measures, established in 2006. They have provided earthquake related project data

for the past two financial years, and also identified a number of projects for the coming financial year.

The information provided is limited in areas, as Naylor Love do not always undertake full performance management on projects <\$1M. Naylor Love also highlighted the challenge of collecting and assessing meaningful performance data so soon after the earthquake. Following the earthquake, organisations big and small were focussed on reacting to the damage. In meeting the short term demands, many businesses including Naylor Love found it difficult to apply day to day management processes in amongst the intense work load and resource demand.

#### 5.5 Data Analysis

This section will look at the specific data provided by the research participants, and offer discussion on some of the more salient or notable points.

##### 5.5.1 SCIRT

SCIRT has provided performance data in the form of bar graphs, which have been extracted from the August 2012 Board Meeting report.

Looking at Figure 5-1, 'Safety Engagement' and 'Safety Audits' appear to be meeting targets. The research team will discuss (with SCIRT) the method of measurement for 'Safety Engagement', as it comprises the number of *recorded safety conversations + the no of near miss and hazard reports*. Performance is shown to exceed the Minimum Conditions of Satisfaction [MCOS], and even meet the stretch target in June 2012 for this KPI, but it is unclear whether it is the 'recorded safety discussion's or 'near miss/hazard' forms that is driving this score.



**Figure 5-1** SCIRT Safety Performance (to July '12) (KRA Safety is sum of all 3 KPI's)

Interestingly, the 'Safety Initiative' KPI does not meet the MCOS. If we look at the frequency of measurement defined by SCIRT, the measure is recorded each month, but only reviewed every six months. With the exception of the 1<sup>st</sup> month (Oct '11), the performance measure only comes close to achieving the MCOS in April and May 2012. This trend might reflect the six monthly reviews, where there is possibly a drive by Senior Management to achieve this target. Between Senior Management reviews, it appears there has been little driving this performance measure.

**Figure 5-2** SCIRT Value for Money (to July '12)

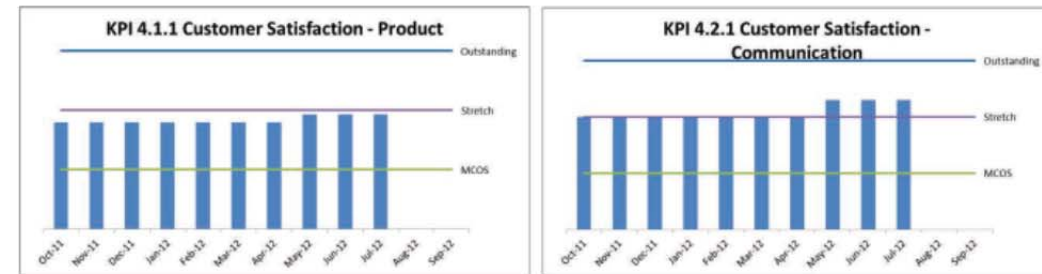
For Value for Money (Figure 5-2), it is clear this performance measure is new, however the rate of work data can be expected to improve when repeat work efficiencies take hold. Furthermore, the number of innovations being realised in July '12 will also support increased timeliness of work output.



**Figure 5-3** SCIRT Our Team Performance (to July '12)

Like most Alliance partnerships, SCIRT place a great deal of emphasis on developing a strong team culture, and having everyone within the team align themselves with the objectives of the broader SCIRT project. 'Health and Wellness Initiatives', as well as 'Ownership of a skilled workforce' are new KPI's. It is evident in 'Alignment' and 'Internal Surveys of wellbeing' that SCIRT has succeeded in bedding down a strong team, and instilling a culture that each of its team members identify with.

Though it is clear from the results in Figure 5-3 that the majority of feedback is positive, there may be benefit in re-evaluating the targets (MCOS 60%, Stretch 70% and Outstanding 80%) set for these two KPI's. It will be interesting to understand what procedures SCIRT has in place for resolving any negative feedback, and how this is driving the performance measures.

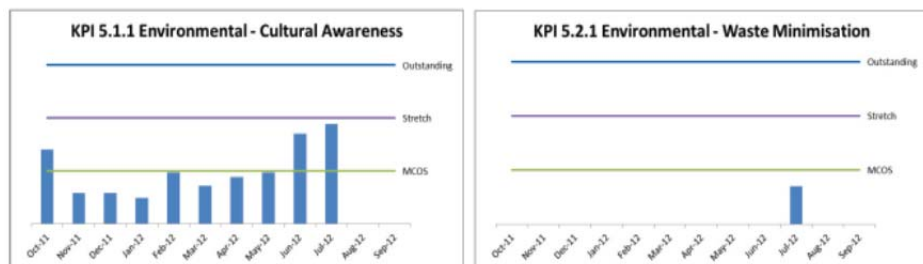


**Figure 5-4** SCIRT Customer Satisfaction Performance (to July '12)

Figure 5-4 suggests that community and stakeholder satisfaction is consistently exceeding the MCOS, and in most recorded months is either achieving, or almost achieving the stretch target. The frequency of measurement is recorded quarterly, and reported every six months.

Performance targets include (MCOS 60%, Stretch 75% and Outstanding 85%). Client Satisfaction is typically benchmarked around the 8 out of 10 score, which appears to be fairly represented by having an Outstanding target at 85%. Similar to the 'Our Team' surveys, it is important to understand how SCIRT use negative feedback from this performance measure to drive change.

The 'environment' was a notable absence in the national performance measures developed by CAENZ in 2006, especially given the effort put into the Consenting process, and Contractor Environmental Management Plans. The environment is an important measure in every construction project, so it is prudent that SCIRT have included it as a performance measure.



**Figure 5-5** SCIRT Environmental Performance (to July '12)

Figure 5-5 shows a degree of inconsistency in both environmental KPI's. Like 'Safety Initiative', it may be that performance is improved when directly addressed by Senior Management (performance recorded monthly, but reviewed every six months). Additional discussion with SCIRT is required to understand the reasons for this inconsistency.

### 5.5.2 Arrow International

Arrow International has supplied data for both Residential Rebuild/Repair and Commercial construction (see Appendix B). The following is a review of the data published.

Firstly, looking at Arrow International's Residential performance data relating to time predictability in Table 5.1, we can see significant variance

in the ability to predict contract duration. If we look at Project 8 in Table 5.1, we can see construction started on the 10<sup>th</sup> January 2011, which was over a month before the 2<sup>nd</sup> earthquake in February 2011. This would have significantly impacted the contractor's ability to meet the original programme, which explains the 66 week duration (20 week original estimate). Most of this time is due to the owner awaiting a second inspection, which came 30 weeks after the initial rebuild start date.

Interestingly, we see that (with the exception of project 3), all 4 projects started in 2012 either finished on or ahead of programme. This could be due to a number of factors, such as

- Christchurch may have moved from recovery to rebuild
- Lessons learned from 2011 have been rolled into 2012 projects
- Contractors are better at estimating residential repair than total rebuilds, (with the exception of project 14, all rebuild projects have taken longer to construct than predicted).

Project Ref	Time			
	(Repair or Rebuild)	Inspection Date	Construct ion Start	Practical Completion
Project 1 (Repair)	25 Aug 11	30 Mar 12	09 Jul 12	-10%
Project 2 (Repair)	19 Jan 11	09 Mar 12	30 Jun 12	0%
Project 3 (Rebuild)	23 May 11	21 Jan 12	05 Jul 12	19%
Project 4 (Repair)	09 Mar 11	13 Mar 12	30 Jun 12	-3%
Project 5 (Rebuild)	13 Jan 11	02 Nov 11	23 Mar 12	1%
Project 6 (Rebuild)	09 Mar 11	15 Nov 11	02 Jul 12	64%
Project 7 (Rebuild)	03 Mar 11	31 Oct 11	21 Jun 12	67%
Project 8 (Rebuild)	09 Aug 11	10 Jan 11	18 Apr 12	231%



Project 9 (Rebuild)	28 Jul 11	18 Nov 11	21 Jun 12	54%
Project 10 (Rebuild)	01 Feb 11	21 Oct 11	25 Jun 12	77%
Project 11 (Rebuild)	21 Dec 10	23 Aug 11	12 Apr 12	66%
Project 12 (Rebuild)	07 Mar 11	03 Oct 11	22 Jun 12	88%
Project 13 (Rebuild)	30 Jun 11	01 Nov 11	05 Jul 12	76%
Project 14 (Rebuild)	14 Feb 11	01 Jun 11	19 Sep 11	-21%
Project 15 (Rebuild)	11 Jan 11	01 Aug 11	24 Feb 12	48%

**Table 5.1** Arrow Internationals Residential Performance Data - Time Predictability

Of particular note, is the time between inspection and the day of construction. This ranges between 15 weeks to 59, with the average being close to 34 weeks.

As we see the Christchurch Rebuild mature into its 3<sup>rd</sup> and 4<sup>th</sup> year, it will be interesting to see how this performance trends. Looking at the same projects, we shall briefly look at both cost and quality. See Table 5.2

Project Ref (Repair or Rebuild)	Cost				Quality
	Estimate d Cost	Contract Price	Actual Cost	Predictability of Cost (%)	Days to Clear ≤ 15
Project 1 (Repair)	\$259,006	\$192,815	\$192,815	-26%	2 days
Project 2 (Repair)	\$203,510	\$146,512	\$146,512	-28%	2 days
Project 3 (Rebuild)	\$406,786	\$354,095	\$354,095	-13%	15 days
Project 4 (Repair)	\$323,511	\$262,064	\$262,064	-19%	10 days
Project 5 (Rebuild)	\$409,018	\$355,805	\$355,805	-13%	0 days
Project 6 (Rebuild)	\$363,897	\$306,143	\$306,143	-16%	2 days
Project 7 (Rebuild)	\$276,782	\$247,350	\$247,350	-11%	5 days
Project 8 (Rebuild)	\$420,678	\$362,163	\$362,163	-14%	15 days
Project 9 (Rebuild)	\$390,443	\$330,664	\$330,664	-15%	2 days

Project 10 (Rebuild)	\$385,298	\$324,571	\$324,571	-16%	2 days
Project 11 (Rebuild)	\$304,944	\$254,247	\$254,247	-17%	0 days
Project 12 (Rebuild)	\$431,874	\$375,217	\$375,217	-13%	20 days
Project 13 (Rebuild)	\$428,909	\$365,283	\$365,283	-15%	5 days
Project 14 (Rebuild)	\$222,580	\$163,544	\$163,544	-27%	10 days
Project 15 (Rebuild)	\$351,338	\$287,720	\$287,720	-18%	10 days

**Table 5.2** Arrow Internationals Residential Performance Data – Cost Predictability & Quality

In reviewing Table 5.2 it appears clear that the actual costs are significantly lower than the estimated costs. It is unusual to see all projects coming in under budget but a volatile market such as Christchurch can produce counter-intuitive results. On average, the actual costs are 17% lower than the estimated costs. This will be discussed further with Arrow, as well as gaining a firm understanding of the process used to manage residential repair and rebuild projects.

Furthermore, the research team will continue to work with Arrow International to better understand the definition of Estimated Price and Contract price. As can be seen from Table 5.2, there is 0% variance between the Contract price and the Actual cost and this might be a data collection problem as we would expect to see project with variations, scope changes and EOT claims, especially given the volatile environment and lengthy durations observed in Table 5.1.

The quality of product appears to be positive for the most part, as all but one is greater than the 15 day target. On average, defects have been cleared in 7 days or less, which is encouraging.

Arrow International has also provided commercial data for two projects, which is summarised in Table 5.3 and Table 5.4. Again, we can see significant slippage in programme.

Project Ref	Time				Satisfaction
	Design Start Date	Construction Start	Practical Completion	Predictability of Duration (%)	Score 1 to 10
Court Theatre	15-Mar-11	18-Jul-11	10-Dec-11	22%	10
Recall	9-Aug-10	16-Sep-10	5-Sep-11	20%	10

**Table 5.3** Arrow Internationals Commercial Performance Data - Time & Satisfaction

Table 5.4 indicates both projects were delivered to a high standard with defects being cleared within 5 days. The Court Theatre was 4% over budget, which may have been justified through Extension of Time claims following the earthquake. The Recall project was delivered 15% under budget.

Project Ref	Cost				Quality
	Estimated Cost	Contract Price	Actual Cost	Predictability of Cost (%)	Days to Clear ≤ 15
Court Theatre	\$4,619,000	\$5,144,000	\$4,800,000	4%	5 days
Recall	\$9,157,600	\$7,742,708	\$7,742,708	-15%	3 days

**Table 5.4** Arrow Internationals Cost & Quality Performance Data

### 5.5.3 Naylor Love

Naylor Love has provided a number of earthquake related projects, with varying degrees of information. To review these, we shall break them into two categories. The first category will focus on those projects where Naylor Love has collected full performance data. The second category will look at projects where Naylor Love has provided partial data, owing to the project being under the \$1M threshold, or other internal reasons.

#### Full Performance Measurement

Three projects have had a full performance assessment undertaken. Though the project titles have been removed to protect Client identity, the projects can be broadly categorised as follows

Project 1	Project 2	Project 3
Commercial & Industrial	Commercial & Industrial	Retail
New Build	New Build	New Build
Value: \$2.3M	Value: \$1.6M	Value: \$7.6M
2011/12 Financial Year	2010/11 Financial Year	2010/11 Financial Year

**Table 5.5** Naylor Love Fully Measured Projects

Table 5.6 summarises how Naylor Love performed in each of the three projects fully measured.

	NL Target	Project 1	Project 2	Project 3
Client Satisfaction - Product	80%	75%	80%	90%
Client Satisfaction - Service	80%	80%	85%	90%
Defects – impact on handover	80%	80%	80%	80%
Defects-cleared in 15 days	≤15	48	20	24
Safety - Safety Accidents	<8	0	0	0
Predictability of Construction Cost	≤0	3%	-7%	8%
Client Perception - Cost	80%	70%	70%	85%
Predictability of Construction Time	≤0	66%	0%	0%
Client Perception - Time	80%	90%	80%	83%
Use Again	80%	80%	85%	90%

**Table 5.6** Naylor Love Project Performance

In reviewing Table 5.6, the benefits of collecting and reporting performance data become clearer. For example, the client's satisfaction with the product delivered in Project 1 scored well but did not meet Naylor Love's target of 80%. It took 48 days to clear defects following hand over. This could have impacted the Client's satisfaction with the product.

The performance data in this instance is suggesting greater emphasis be placed on reducing and/or resolving building defects. This is a good example of using performance data to identify opportunities to improve delivery, and it will be interesting to see how Naylor Love develops strategies to improve this area.

The table points to variability of clients perceptions to cost and time. For Project 1, the project duration was 66% greater than originally estimated, yet the Client perceived time management to be at 90%.

#### Partial Performance Measurement

Where Naylor Love has not undertaken full performance measurement, it has collected four key measures, regardless of budget threshold. By default, Naylor Love collects performance data on:

- Defects cleared within 15 days
- Safety Accidents
- Predictability of Construction Cost
- Predictability of Construction Time

Naylor Love provided 22 projects (excluding the three projects presented in Table 5.6) containing this performance data, and are summarised as follows.



	Target Met	Target not Met	NL Target %	Success %
Quality – Defects cleared <15 days	17	5	75%	77%
Safety Accidents <8 LTI's per 200,000 hours	21	1	85%	95%
Cost Predictability – on target or better	11	11	70%	50%
Time Predictability – on target or better	16	6	80%	73%

**Table 5.7** Naylor Love 22 Projects with limited performance measurement

The results shown in Table 5.7 indicate that whilst defects and safety are meeting Naylor Love's internal targets, the prediction of time and budget is not achieving positive results. This is understandable given that these projects are earthquake related.

The data provided in Table 5.6 and Table 5.7 can be used as a baseline to compare future results.

## 6 ACHIEVING 20% BY 2020

As stated in Section 1, the long term objective is to increase productivity in the New Zealand construction industry by 20%, and by the year 2020. To achieve this target, the industry must first understand its current position (baseline), so that any improvement can be identified against this baseline, and investigated further.

Through working with each research participant, a number of projects have been identified and discussed (see section 5), and a snapshot of their performance has been recorded. With a baseline established, it is important to develop the following key areas:

1. Where is the Problem?  
Work with research participants to better understand how/if they analyse KPI results, and actively identify problem areas
2. How is the Problem solved?  
Understand how each research participant develops improvement strategies to tackle under performance
3. Has the solution worked?  
Record how improvement measures are tested and tracked in their respective organisations

By answering these three key questions, the research team can begin to unearth industries ability to identify a problem, adapt to overcome that problem, and importantly confirm that the problem has been resolved. The mechanisms and processes used by our research participants to elicit positive change can be discussed in detail, and using empirical evidence,

the measures which have generated improvement can be rolled out across the industry. Importantly, those measures that were introduced, but did not result in improvements can also be highlighted and treated with caution.

## 7 CONCLUSIONS

1. The research team successfully identified projects in four different categories, including
  - Residential New Build
  - Residential Repair
  - Commercial
  - Horizontal Infrastructure
2. Project data has been collected against each of the areas identified in the methodology, with the exception of
  - Whether clients have skills in, or sought advice on procurement
  - Use of Prefab components
  - Attitude to Prefab
  - And experience with the regulatory system

The research team shall be sitting with each of the research participants Jan/Feb 2013 to understand their views on prefabrication, the regulatory system and their approach to procurement.

3. Interaction with research participants has been encouraging. An area of continued focus in the coming months will be to breakdown some of the commercially sensitive issues that have obstructed data harvesting.
4. Research participants are working against challenging programmes as part of the Canterbury Rebuild, particularly EQR and SCIRT who have

the added pressure of establishing a new organisational structure and culture from scratch. The research team will continue to work with its research participants, and look for opportunities to encourage increased communication and data provision.

5. Performance management needs to focus principally on four key aspects, including safety, quality, timeliness and cost. The successful combination of these four drivers is key to achieving performance improvements within the New Zealand construction industry.
6. A guide or manual needs to be prepared, clearly defining performance terms, standardising measurement calculations and giving consistent direction to creating performance measures.
7. Greater encouragement or incentive needs to be given to junior & senior staff (typically responsible for maintaining performance measures). The benefit of having a dedicated Best Practice Manager (as with Naylor Love) was clear. Organisations who wish to champion performance measurement as an effective management tool should consider establishing a Best Practice Manager role within their organisation.
8. With the exception of Arrow International and Naylor Love, both of which use the performance measures developed in 2006, there appears to be little opportunity to directly compare performance data across our four research participants. Focus should instead be on developing a set of performance measures that are shown to deliver reliable and measurable results for each research partner, and develop a revised performance management data set for New

Zealand's construction industry based on robust measures that are proven to work.

9. During the data collection process, two of the four research participants wanted to understand how benchmarking would be achieved in the mid to long term. Without a stable and independent custodian or organisation to maintain a national performance data base, long term measurement and benchmarking could remain vulnerable. This was evident in 2006 when the CAENZ produced a national performance dataset, but was unable to maintain the integrity of that data set into the mid and long term.

## 8 RECOMMENDATIONS

1. For the benefit of the New Zealand construction industry, it is recommended that the research team continue working with the four research participants, and collect performance data that can be assessed and delivered in subsequent reports.
2. It is recommended that the Productivity Partnership, along with its partners, give consideration to the type and form of a national body or partnership that can sustainably collect and report on performance data for the industry. This will provide the platform for setting best practice and allow project leaders to benchmark project progress against national leaders.
3. This report is a performance baseline. Further investigation is required to better understand the steps being taken by research participants to address performance issues and action improvement strategies. Only at this point can the research team identify measures that achieve productivity gains, and report back to industry those findings which yield the greatest opportunities for achieving 20% productivity improvements by 2020.

## 9 BIBLIOGRAPHY & REFERENCES

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## 10 APPENDICES

- A. SCIRT Data
- B. Arrow International Data
- C. Naylor Love KPI Data

## APPENDIX A

SCIRT PERFORMANCE MEASURES & PERFORMANCE DATA (to July 2012)

## 1. SAFETY

Why Important?	'Zero Harm' is a non-negotiable philosophy regarded as a foundation to business success for all of our people and communities we operate in.					
Objective	1.1 Achieve the buy-in from our people that all injuries can be prevented by encouraging safety conversations, hazard reports, near miss reports and safety audits. 1.2 Set new standards for safety management, which are proactive and consistent, by encouraging ground level ownership and leadership of safety initiatives and sharing lessons learnt.					
KRA Weighting	0% (not impacting Limb 3 calculations)					
KRA champion	Greg Slaughter					
KPIs	KPI WEIGHTING	MEASURE	TIMING OF MEASURE	MCOS	STRETCH	OUTSTANDING
1.1 Measure of Safety Engagement – Awareness - Safety Conversations - Hazard Reports - Near Miss reports - Safe Acts Audits	40%	1. Combined no. of recorded safety conversations + no. of Near Miss & Hazard reports.(measured per 1,000 man hrs)	Recorded monthly  Reviewed six monthly	5 engagements	15 engagements	25 engagements
	30%	2. Safety Audits  (measured per 1,000 man hrs)	Recorded monthly  Reviewed six monthly	0.5 audits	1.5 audits	3 audits
1.2 Safety Initiatives – Action - Close Out - Safety Initiatives - Spreading the lessons learned	30%	1. Combined no. of Safety initiatives (unprompted action taken to improve safety) and satisfactory close-outs (incl. passing on lessons learned) of the above engagements.(measured per 1000 man hrs)	Recorded monthly  Reviewed six monthly	0.5 initiatives	1 initiative	1.5 initiatives

## 2. VALUE

Why Important?	Delivery of Value is a foundation element of the SCIRT infrastructure rebuild and is a necessary reassurance for taxpayers and ratepayers that the rebuild program is being carried out in the best possible manner from SCIRT functions and for projects from inception to handover.					
Objective	<p>The key performance indicators (KPIs) of this key result area are selected to provide specific focus beyond the intended value and money management fundamentals which SCIRT utilises, measures and reports in general operations.</p> <p>2.1 is intended to provide a measure of productivity improvement. The measure will track output and enable reviews of similar items in a variety of projects over time. It will enable comparison with cost escalation that is separately monitored from input costs. The measure is in addition to cost measures provided by the project out-turn cost process. It will create and maintain a focus on productivity efficiency improvements in the day-to-day work of delivery.</p> <p>2.2 (a) and (b) are methodical scoring systems based on items that are recorded in normal business, scored by independent reviewers. The system format is modelled on NZTA consultant / contractor scoring systems. They are intended to drive a continuous improvement mindset.</p> <p>2.3 is the identification of SCIRT innovations and is intended to foster an on-going attitude that things can be done better.</p>					
KRA Weighting	35%					
KRA champion	Rod Cameron					
KPIs	KPI WEIGHTING	MEASURE	TIMING OF MEASURE	MCOS	STRETCH	OUTSTANDING
2.1 Productivity Gains Rate of Work Completed by month and Average over project	40%	A small number of measures are nominated in the Target Out-turn Cost such as the length of pipe laid and completed per month per project. The measure will be expressed a percentage of the TOC rate for each measure.	Recorded and reviewed monthly and at project completion.	As TOC rates	103% of TOC rates	105% of TOC rates
2.2 Quality (a) Project Design Review	15%	A project performance scoring system that measures satisfaction with the concept and detailed design as judged by designers and estimators, closely modelled on the NZTA designer scoring system	Both recorded at the end of the relevant stage (design and construction)	60% Score	70%	80%
(b) Project Construction Review	15%	A Delivery project scoring system similar to the preceding for designs and incorporating Non-Conformance Reports of re-work, self-scored with coordinator review.		60% Score	70%	80%
2.3 Innovations	30%	Innovations created then used by SCIRT, captured in the value register. (Innovation defined a feature of system, operation or built work that gives better performance at same cost or same performance at less cost)	Both recorded monthly and reviewed three-monthly	Two Innovations in a month	Three Innovations per month	Five Innovations per month



## 3. OUR TEAM

Why Important?	The outcomes delivered by a high performing team are strongly impacted by first having skilled resources and then building success by creating a shared and well communicated vision, goals and objectives. Measuring the enrolment and wellbeing of the team to achieve these outcomes enables a proactive plan for creating a challenging and stimulating team environment that delivers results					
Objective	<p>KPI 3.1 will measure the success in enrolling all sub-teams into the goals and objectives of the broader SCIRT team. This KPI can be impacted both by the IST and the Delivery teams.</p> <p>KPI 3.2a The first part of this KPI will measure health and wellbeing of the IST. The survey will be in viewed conjunction with the Annual Health checks to form a complete picture</p> <p>KPI 3.2b This KPI will ensure that proactive health and wellbeing initiatives are being continued for the duration of the program and that lessons are being shared across the industry</p> <p>KPI 3.3 This KPI is focused on delivering an outcome of upskilled resources for the programme and leaving a legacy of an improved training model for the Industry. The success of this is reliant on stakeholder (primarily Delivery Teams') contribution and participation to this training model.</p>					
KRA Weighting	20%					
KRA champion	Belinda de Zwart					
KPIs	KPI WEIGHTING	MEASURE	TIMING OF MEASURE	MCOS	STRETCH	OUTSTANDING
<b>3.1 Alignment and Involvement of the Team</b> - Involvement of partners in establishing SCIRT standards - Demonstration of collaboration	50%	Survey of the Team to assess levels of involvement and Interaction between Client, Board, MT and Delivery Teams. Questions of Survey in a separate document.  Questions will be created with the assistance of specialist 'Survey' support and attached as separate document. Questions may be changed over the course of the Programme to capture key relevant information.	Recorded monthly  Reviewed six monthly	60% positive feedback from survey	70% positive feedback from survey	80% positive feedback from survey
<b>3.2 Health and Wellbeing</b> - Wellness in an environment of uncertainty  <b>Health and Wellness Initiatives</b> - Unprompted Action - Close Out - Health and Wellness Promoted - A Learning Industry	10%	(a) Internal Survey measuring employee self-reporting on own wellbeing. Included in these questions will be ones on engagement.  Questions will be created with the assistance of specialist 'Survey' support and will complement the Annual Health Checks	Recorded monthly  Reviewed six monthly	60% positive feedback from survey	70% positive feedback from survey	80% positive feedback from survey
	25%	(b) Combined number of Health and Wellbeing initiatives across SCIRT (unprompted action taken to improve Health and Wellbeing) and satisfactory close-outs (incl. passing on lessons learned) of the above engagements (measured per month)	Recorded monthly  Reviewed quarterly	2 initiatives	3 initiatives	6 initiatives
<b>3.3 Ownership of a Skilled Workforce</b>	15%	Number of operatives engaged in NZQA Qualifications (including SCIRT version) as a % of SCIRT field team members	Recorded monthly Reviewed quarterly	20% participation	30% participation	40% participation

## 4. CUSTOMER SATISFACTION

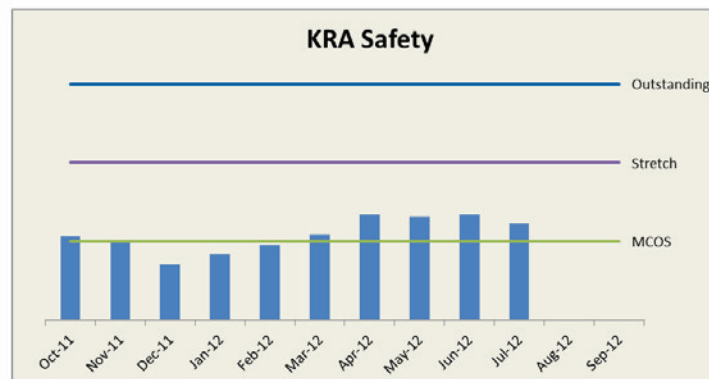
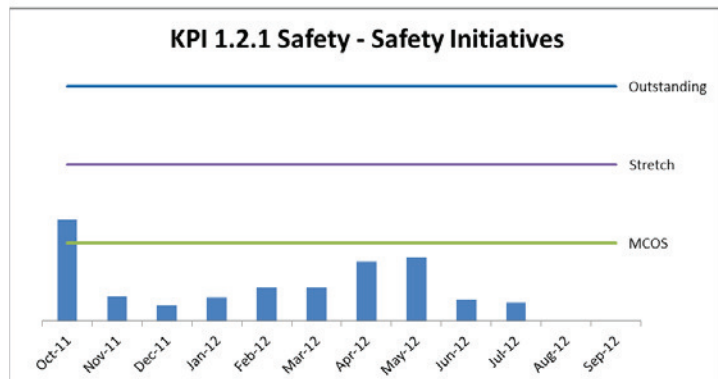
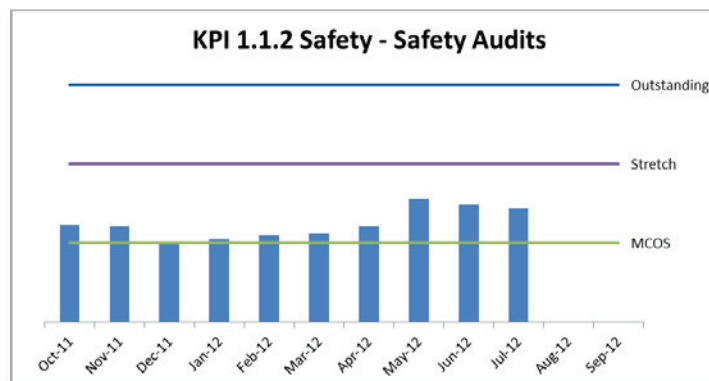
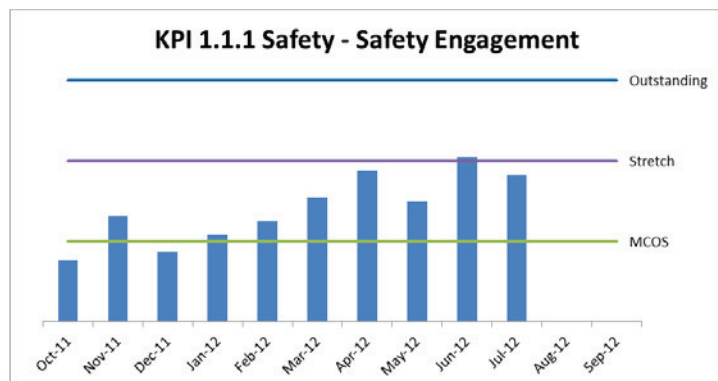
Why Important?	We are delivering this programme of projects for the customer, that is, the stakeholders and communities of Christchurch, and therefore it is essential that we measure their level of satisfaction. We need to ensure our customers know what we are doing and how we are doing it. We need to know that they are satisfied with the process and the outcome.					
Objective	<ul style="list-style-type: none"> <li>All Alliance teams are highly committed and go out of their way to achieve the highest possible standards during construction and community engagement.</li> <li>The desired outcome is that the local community and stakeholders respect and trust the Alliance team and are supportive of the engagement process.</li> </ul>					
KRA Weighting	30%					
KRA champion	Annemarie Mora					
KPIs	KPI WEIGHTING	MEASURE	TIMING OF MEASURE	MCOS	STRETCH	OUTSTANDING
4.1 Community and stakeholder satisfaction with product	50%	A combination of results from three surveys will be used to determine <u>both</u> KPIs: <ul style="list-style-type: none"> <li>community in areas where work has finished (face-to-face survey, carried out 2 to 4 weeks after work package completed, reported every 3 months)</li> <li>a representative sample from wider Christchurch community (telephone survey, 6 monthly, reported every 6 months)</li> </ul>	Recorded quarterly Reviewed six monthly	60%	75%	85%
4.2 Community and stakeholder satisfaction with communication	50%	<ul style="list-style-type: none"> <li>identified representatives from key stakeholder organisations (medium to be determined with stakeholder and carried out quarterly)</li> </ul>	Recorded quarterly Reviewed six monthly	60%	75%	85%

## 5. ENVIRONMENTAL

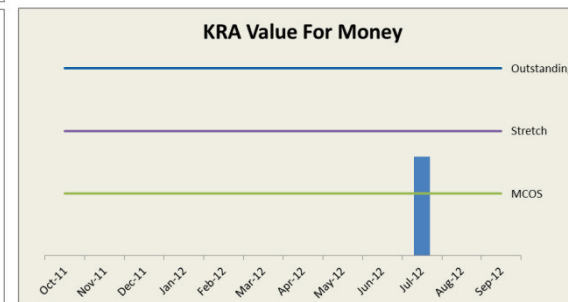
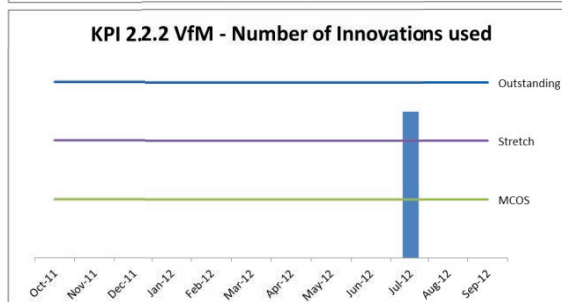
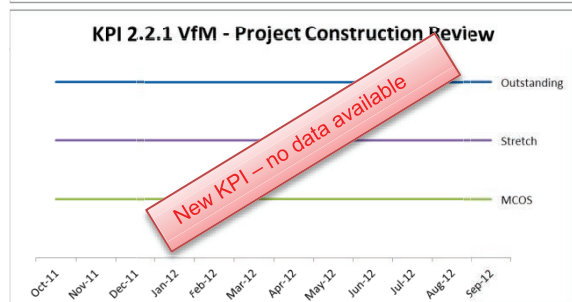
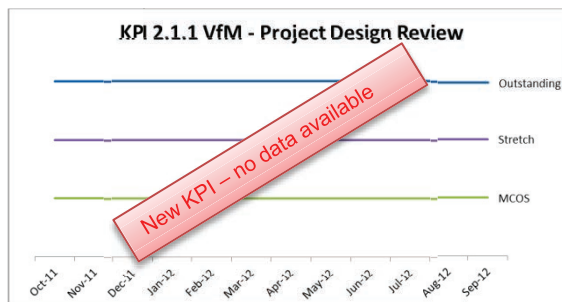
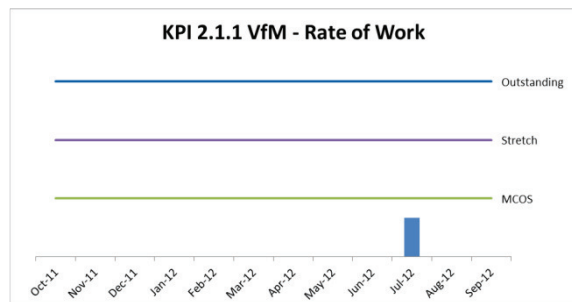
Why Important?	To deliver an environmentally sensitive rebuild and minimise impacts during and after construction					
Objective	5.1 To develop environmentally aware people who proactively identify environmental incidents, opportunities and initiatives in the field, and act on them. 5.2 Promote innovative and sustainable construction practices which add value to the rebuilding of Christchurch.					
KRA Weighting	15%					
KRA champion	Greg Slaughter					
KPIs	KPI WEIGHTING	MEASURE	TIMING OF MEASURE	MCOS	STRETCH	OUTSTANDING
5.1 <u>Construction</u> Culture – incidents/ hazards reported - Field initiated response	60%	1. Culture/ awareness levels (Lead indicator) <ul style="list-style-type: none"> <li>Scoring system to gauge field initiated awareness through incidents/opportunities/ initiatives raised per month</li> <li>Scoring system based on significance/impact               <ul style="list-style-type: none"> <li>1 point for environmental hazards or opportunities that are actioned</li> <li>5 points for initiatives that are adopted by team</li> <li>10 points for community organised events</li> </ul> </li> </ul>	Recorded monthly  Reviewed six monthly	70 points per month	120 points per month	170 points per month
5.2 Waste Minimisation Reduce, reuse and recycle	40%	<ul style="list-style-type: none"> <li>Demonstration that available alternative materials and methods have been considered.</li> </ul> As determined by the monthly audit (scored between 1- 10). Process developed in conjunction with key stakeholders.	Recorded monthly  Reviewed six monthly	Audit score $\geq 4$	Audit score $\geq 6$	Audit score $\geq 8$

## Appendix 11. – KRA / KPIs

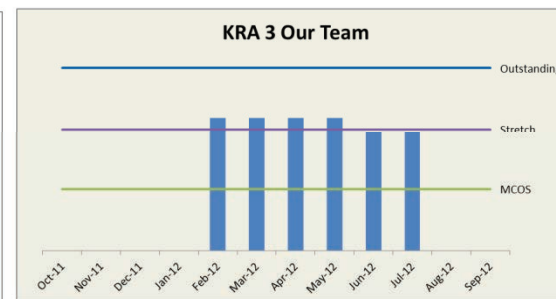
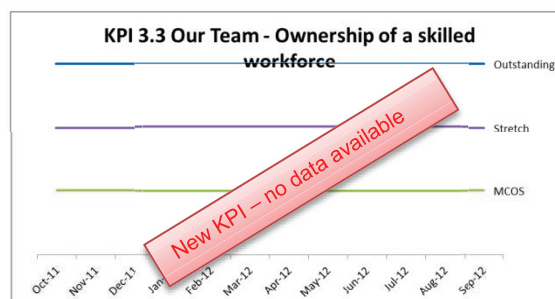
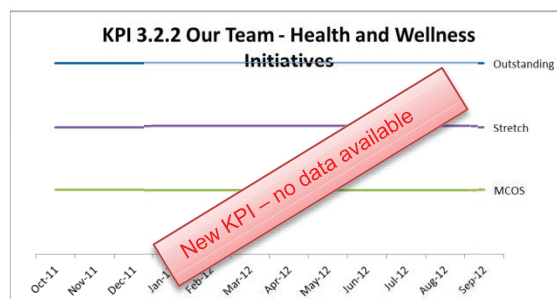
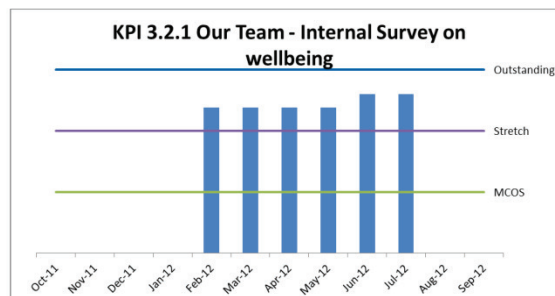
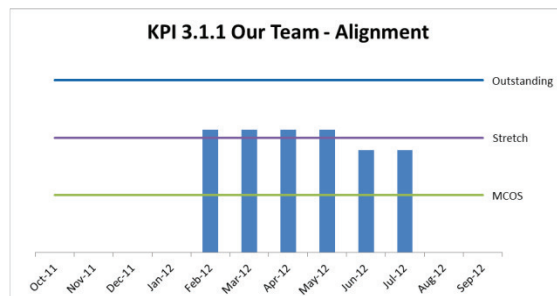
Safety – Please Note, all KPIs have been retrospectively adjusted to new targets



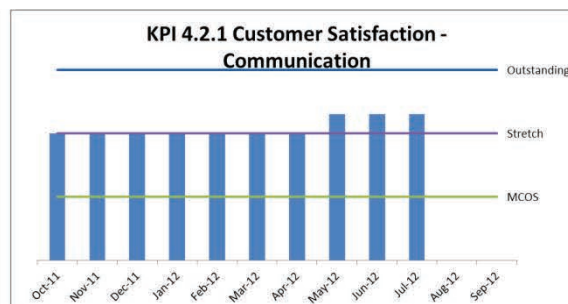
**Value for Money – Please Note, all KPIs have been retrospectively adjusted to new targets**



**Our Team – Please Note, all KPIs have been retrospectively adjusted to new targets**

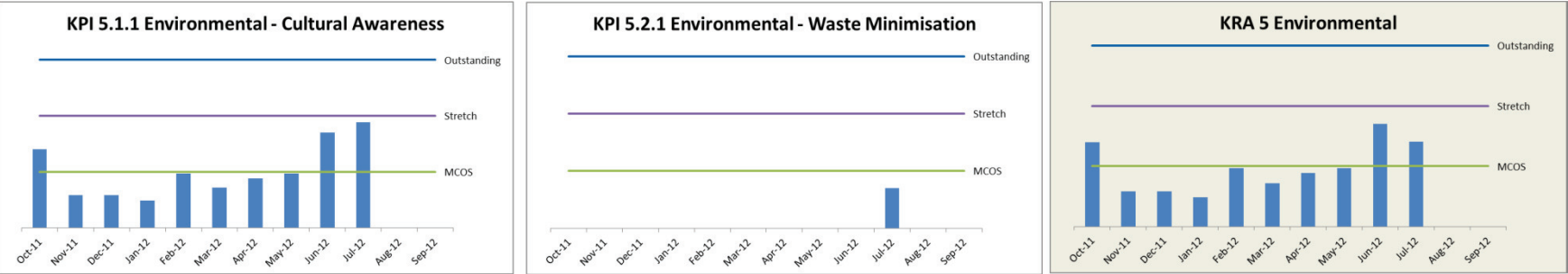


**Customer Satisfaction – Please Note, all KPIs have been retrospectively adjusted to new targets**





**Environmental – Please Note, all KPIs have been retrospectively adjusted to new targets**



## APPENDIX B

ARROW INTERNATIONAL PERFORMANCE DATA (to July 2012)

Residential Repair/Rebuild Project Key Result Indicators													
Project Reference No	Time						Cost				Quality		Satisfaction
(Repair or Rebuild)	Inspection Date	Construction Start	Practical Completion	Anticipated Duration (weeks)	Actual Duration (weeks)	Predictability of Duration (%)	Estimated Cost	Contract Price	Actual Cost	Predictability of Cost (%)	Days to Clear ≤ 15	Score 1 to 10	
Project 1 (Repair)	25 Aug 11	30 Mar 12	09 Jul 12	16	14	-10%	\$259,006	\$192,815	\$192,815	-26%	2 days	✓	
Project 2 (Repair)	19 Jan 11	09 Mar 12	30 Jun 12	16	16	1%	\$203,510	\$146,512	\$146,512	-28%	2 days	✓	
Project 3 (Rebuild)	23 May 11	21 Jan 12	05 Jul 12	20	24	19%	\$406,786	\$354,095	\$354,095	-13%	15days	✓	
Project 4 (Repair)	09 Mar 11	13 Mar 12	30 Jun 12	16	16	-3%	\$323,511	\$262,064	\$262,064	-19%	10 days	✓	
Project 5 (Rebuild)	13 Jan 11	02 Nov 11	23 Mar 12	20	20	1%	\$409,018	\$355,805	\$355,805	-13%	0 days	✓	
Project 6 (Rebuild)	09 Mar 11	15 Nov 11	02 Jul 12	20	33	64%	\$363,897	\$306,143	\$306,143	-16%	2 days	✓	
Project 7 (Rebuild)	03 Mar 11	31 Oct 11	21 Jun 12	20	33	67%	\$276,782	\$247,350	\$247,350	-11%	5 days	✓	
Project 8 (Rebuild)	09 Aug 11	10 Jan 11	18 Apr 12	20	66	231%	\$420,678	\$362,163	\$362,163	-14%	15 days	✓	
Project 9 (Rebuild)	28 Jul 11	18 Nov 11	21 Jun 12	20	31	54%	\$390,443	\$330,664	\$330,664	-15%	2 days	✓	
Project 10 (Rebuild)	01 Feb 11	21 Oct 11	25 Jun 12	20	35	77%	\$385,298	\$324,571	\$324,571	-16%	2 days	✓	
Project11 (Rebuild)	21 Dec 10	23 Aug 11	12 Apr 12	20	33	66%	\$304,944	\$254,247	\$254,247	-17%	0 days	✓	
Project 12 (Rebuild)	07 Mar 11	03 Oct 11	22 Jun 12	20	38	88%	\$431,874	\$375,217	\$375,217	-13%	20 days	✗	
Project 13 (Rebuild)	30 Jun 11	01 Nov 11	05 Jul 12	20	35	76%	\$428,909	\$365,283	\$365,283	-15%	5 days	✓	
Project 14 (Rebuild)	14 Feb 11	01 Jun 11	19 Sep 11	20	16	-21%	\$222,580	\$163,544	\$163,544	-27%	10 days	✓	
Project 15 (Rebuild)	11 Jan 11	01 Aug 11	24 Feb 12	20	30	48%	\$351,338	\$287,720	\$287,720	-18%	10 days	✓	

Awaiting Data

## Christchurch Commercial Projects

[illegible]

## APPENDIX C

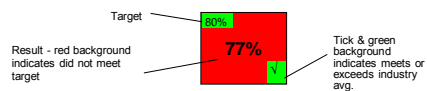
NAYLOR LOVE PERFORMANCE DATA (to July 2012)

# CANTERBURY Benchmarking Results FY10/11

				Industry Average	July - Sept 2010			Oct-Dec 2010		Jan-Mar 2011		Canterbury FY10/11	
KPI	Measure		Category: Type: Value:		Category: Type: Value:	Category: Type: Value:	Category: Type: Value:	Category: Type: Value:	Category: Type: Value:	Category: Type: Value:			
			score		score	score	score	score	score	score	avg score	% of projects meeting target	
CLIENT SATISFACTION	with Product <div>Client measure</div>	scoring 8/10 or better	88%	n/a	n/a	n/a	8	9	n/a	n/a	8.5	90% 100%	
	with Service <div>Client measure</div>	scoring 8/10 or better	39%	n/a	n/a	n/a	8.5	9	n/a	n/a	8.8	80% 100%	
DEFECTS	Impact on Handover <div>Client measure</div>	scoring 8/10 or better	31%	n/a	n/a	n/a	8	8	n/a	n/a	8	70% 100%	
	Cleared within 15 days	defects cleared within 15 days	n/a	40	40	6	20	24	>15	>15	26	75% 14%	
SAFETY	Safety Accidents	<8 LTIs per 200,000 hrs	33%	0	0	0	0	0	0	0	0	85% 100%	
COST	Predictability of Construction Cost	on target or better	39%	8%	2%	-4%	-7%	8%	501%	-4%	72%	70% 43%	
	Client Perception - Cost	scoring 80% or better	n/a	n/a	n/a	n/a	70%	85%	n/a	n/a	78%	80% 50%	
TIME	Predictability of Construction Time (EOT)	on target or better	n/a	37%	42%	0%	0%	0%	2%	34%	16%	80% 43%	
	Client Perception - Time	scoring 80% or better	n/a	n/a	n/a	n/a	80%	83%	n/a	n/a	81.5%	80% 100%	
Use Again	Use NL again <div>Client measure</div>	scoring 8/10 or better	n/a	n/a	n/a	n/a	8.5	9	n/a	n/a	8.8	95% 100%	

## Explanatory Notes

- The coloured quarter/year to date cells should be read as follows:
  - division target in top left corner
  - division result in centre, if on green background it met target, if on red background it did not meet target
  - tick or cross in bottom right corner - tick = met or exceeded industry avg; cross = did not meet industry avg; na = no industry avg



- The projects headed in blue text undertook full benchmarking KPIs, those headed in black text were only measured against internal KPIs.

CANTERBURY Benchmarking Results FY11/12

			Industry Average	Category: Education Extension Type: Value: \$1.2 million Category: Commercial & Industrial New build Type: Value: \$2.0 million Category: Retail Earthquake repairs Type: Value: \$25 million Category: Commercial & Industrial New build Type: Value: \$2.3 million Category: Commercial & Industrial Demolition Type: Value: \$1.0 million Category: Leisure & Culture Earthquake make safe Type: Value: \$3.5 million Category: Retail New build Type: Value: \$320k Category: Retail New build Type: Value: \$340k Category: Commercial & Industrial New build Type: Value: \$450k Category: Commercial & Industrial demolition Type: Value: \$495k Category: Commercial & Industrial demolition Type: Value: \$1.2 million Category: Commercial & Industrial demolition Type: Value: \$500k Category: Commercial & Industrial demolition Type: Value: \$1.2 million Category: Leisure & Culture demolition Type: Value: \$415k Category: Leisure & Culture earthquake repairs Type: Value: \$435k Category: Education earthquake repairs Type: Value: \$1 million Category: Education earthquake repairs Type: Value: \$200k Category: Retail demolition Type: Value: \$350k																		Canterbury FY11/12	
KPI			Measure	###	###	###	###	###	###	###	###	###	###	###	###	###	###	###	###	###	###	avg score	% of projects meeting target
CLIENT SATISFACTION	with Product <div>Client measure</div>	scoring 8/10 or better	88%	n/a	n/a	n/a	7.5	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	7.5	<div><div>90%</div><div>0%</div><div>x</div></div>
	with Service <div>Client measure</div>	scoring 8/10 or better	39%	n/a	n/a	n/a	8	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	8.0	<div><div>80%</div><div>100%</div><div>✓</div></div>
DEFECTS	Impact on Handover <div>Client measure</div>	scoring 8/10 or better	31%	n/a	n/a	n/a	8	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	8	<div><div>70%</div><div>100%</div><div>✓</div></div>
	Cleared within 15 days	defects cleared within 15 days	n/a	0	222	0	48	0	0	6	6	0	0	0	0	0	0	0	0	0	0	14	<div><div>75%</div><div>88%</div><div>n/a</div></div>
SAFETY	Safety Accidents	<8 LTIs per 200,000 hrs	33%	0	0	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	<div><div>85%</div><div>92%</div><div>✓</div></div>
COST	Predictability of Construction Cost	on target or better	39%	34%	16%	0%	3%	6%	0%	106%	11%	4%	-14%	50%	0%	-5%	1%	0%	0%	-5%	-17%	10%	<div><div>70%</div><div>50%</div><div>✓</div></div>
	Client Perception - Cost	scoring 80% or better	n/a	n/a	n/a	n/a	70%	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	70%	<div><div>80%</div><div>0%</div><div>n/a</div></div>
TIME	Predictability of Construction Time (EOT)	on target or better	n/a	307%	78%	0%	66%	0%	0%	0%	0%	0%	0%	0%	-53%	0%	0%	0%	0%	0%	0%	18%	<div><div>80%</div><div>83%</div><div>n/a</div></div>
	Client Perception - Time	scoring 80% or better	n/a	n/a	n/a	n/a	90%	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	90%	<div><div>80%</div><div>100%</div><div>n/a</div></div>
Use Again	Use NL again <div>Client measure</div>	scoring 8/10 or better	n/a	n/a	n/a	n/a	8	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	8.0	<div><div>95%</div><div>100%</div><div>n/a</div></div>

Explanatory Notes

1. The coloured quarter/year to date cells should be read as follows:  
- division target in top left corner  
- division result in centre, if on green background it met target, if on red background it did not meet target  
- tick or cross in bottom right corner - tick = met or exceeded industry avg; cross = did not meet industry avg;  
na = no industry avg

Target

Result - red background indicates did not meet target

Tick & green background indicates meets or exceeds industry avg.



### Canterbury projects FY12/13

NL Reference	Category	Type	Value	Expected completion
69175	Retail	Earthquake repairs	\$790k	Aug-12
69159	Civil	new build	\$1.2 million	Aug-12
69128	Retail	Earthquake repairs	>\$1 million	Oct-12
69170	Commercial & Industrial	new build	\$2.9 million	Oct-12
69163	Education	Earthquake repairs	\$2 million	Nov-12
69151	Health & Wellbeing	Earthquake repairs	\$2 million	Oct-14
69134/62	Leisure & Culture	Earthquake repairs	unknown	unknown
69191	Retail	Extension	\$3 million	Jan-13
69193	Commercial & Industrial	Extension	\$530k	Oct-12
69194	Retail	Earthquake repairs	\$960k	Mar-13
69192	Leisure & Culture	new build	\$4.3 million	Dec-12