Regional Construction and Demolition Waste



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Regional Construction & Demolition Waste

ER00963: Final Report

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Executive Summary

Construction and demolition (C&D) waste is waste generated from any building construction or demolition works; and includes materials such as concrete, plasterboard, wood, steel, brick, cardboard, metals, plastic or glass (Selwyn District Council, 2019).

Managing C&D waste has become one of the major environmental problems in the world (Oyenuga, Bhamidiarri and Naoum, 2014). In New Zealand, the construction industry is one of the largest waste producing industries in the country (BRANZ, 2014). However, there are significant gaps in data about the quantity and type of waste disposed of in New Zealand, including C&D waste (MFE, 2020).

This research therefore sought to understand if it is currently possible to identify the volume and composition of C&D waste on a regional basis across New Zealand; what stakeholders see as the main barriers to minimising current levels of C&D waste; and what stakeholders consider to be the priority actions required to minimise current levels of C&D waste.

Two surveys of building industry and waste management stakeholders, and a data collection exercise, were undertaken to answer these questions.

- In relation to the first research question, it was found that at the current time, it was not possible to identify the volume and composition of C&D waste across New Zealand. This is because C&D waste data was not consistent between regions and may not always be reliable. In addition, a survey of waste industry stakeholders found that only a quarter regularly collected C&D waste data. However, the vast majority (95%) of stakeholders who did regularly collect C&D waste data found it useful for influencing business practices.
- The second research question sought to understand what building and construction industry and waste management stakeholders saw as the main barriers to minimising current levels of C&D waste.
 Through the two surveys completed, the main barriers to C&D waste



minimisation identified included a lack of *opportunity* to divert C&D waste from landfill (including a lack of facilities that will take C&D waste materials for recycling and reuse); *cost and incentives* (including ease of throwing waste in a skip and landfilling being the cheapest disposal option); and *knowledge* (including lack of understanding regarding which C&D waste materials can be recycled and reused, and those which cannot).

• The third research question sought to understand what stakeholders considered to be the priority actions required to minimise current levels of C&D waste. The most commonly identified actions to promote C&D waste minimisation included: on-site opportunity for sorting materials; off-site opportunity through the provision of more and better facilities for the recycling and reuse of C&D waste; increased regulatory tools (including more rules and regulations on how C&D waste is currently managed); and knowledge, including greater awareness around managing C&D waste.

The surveys completed for this research also identified a general willingness to do better in relation to C&D waste minimisation. The survey of building companies, for example, found that the majority (83%) considered that the recycling and reuse of C&D waste materials was a good idea. In the survey of waste sector stakeholders, the majority of respondents (98%) agreed that the recycling and reuse of C&D waste materials was a good idea.

These positive responses provide a strong basis from which to convert willingness into action regarding C&D waste minimisation. As noted by two respondents to the waste stakeholders survey "it is going to take a multifaceted approach to solve the problem" and "I think it requires working towards a multipronged approach tackling it from all directions".



1 Introduction

In 2014 BRANZ identified the construction industry as one of the largest waste producing industries in New Zealand. At this time, construction and demolition (C&D) waste was considered to represent up to fifty percent of all waste generated in New Zealand, twenty percent of all waste going to landfill, and eighty percent of all waste going to cleanfill (BRANZ, 2014). In relation to the residential construction sector alone, further BRANZ research indicated that for every new residential build, approximately four-tonnes of waste goes to landfill (Garnett and Jaques, 2018).

These numbers are substantial. As noted by Mithraratne (2015), construction and demolition waste represents a significant wastage of natural resources and energy. Opportunities therefore exist for the New Zealand construction industry to improve performance and minimise current levels of C&D waste.

To understand these opportunities further, BRANZ commissioned research into the volume and composition of construction waste on a region by region basis across New Zealand. Following the deployment of a pilot study of two regions, the methodology for completing this research was refined to respond to the following research questions:

- 1. Is it currently possible to identify the volume and composition of C&D waste on a regional basis, across New Zealand?
- 2. What do stakeholders see as the main barriers to minimising current levels of C&D waste?
- 3. What do stakeholders consider to be the priority actions required to minimise current levels of C&D waste?

This report represents the culmination of this latest BRANZ research into C&D waste. It describes the methodology undertaken to answer each of the research questions above, and the findings for each. Using this information, a set of priority actions to promote C&D waste minimisation are identified alongside implications of these actions for the construction industry.



It is anticipated that this report will inform future research initiatives, policy interventions, and construction and waste sector responses to minimise C&D waste and achieve the environmental and economic benefits of reducing waste to landfill (Envision, 2019).

2 Background

This section provides a snapshot of the current legislative framework for waste management and minimisation in New Zealand, along with a summary of current initiatives underway to minimise current levels of C&D waste. It is intended to provide the background necessary to contextualise later research findings regarding barriers and actions to achieve C&D waste minimisation across the country.

2.1 Legislative framework

The overarching document in New Zealand's waste management and minimisation framework is the New Zealand Waste Strategy, which was revised by the Ministry for the Environment (MFE) in 2010. This document set out the government of the time's long-term priorities and goals in relation to waste management and minimisation. These goals included reducing the harmful effects of waste and improving the efficiency of resource use (MFE, 2010).

Interestingly, C&D waste is not specifically addressed in the Waste Strategy apart from being included in the definition of 'waste'. Rather, the Waste Strategy serves as a high level document beneath which sits the legislative framework and other tools considered necessary to achieve the goals articulated in the document. This framework is identified in Figure 1.



Figure 1: Legislative framework for waste management & minimisation



Source: MFE, 2010

Of the legislation identified in Figure 1, MFE has specific functions under the Waste Minimisation Act 2008, Hazardous Substances and New Organisms Act 1996, Climate Change Response Act 2002, and the Resource Management Act 1991. MFE is therefore a key player in New Zealand's waste management and minimisation framework, with a mandate to develop legislation and regulation to guide the current Government's goal to minimise waste and encourage more efficient use of resources (MFE, 2020).

The Building Act 2004 also contains sustainability principles that the Ministry of Business, Innovation and Enterprise (MBIE) and building consent authorities (BCAs) must take into account under the Act. These include the efficient and sustainable use of materials and the reduction of waste during the construction process (Minimising waste when building, 2020).

Local government (including regional councils and territorial authorities) is also a key stakeholder charged with planning, implementing, and regulating



waste management and minimisation practices. For example, regional councils are responsible for developing, monitoring, and enforcing rules about the environmental effects of waste disposal on land (MFE, 2020).

Territorial authorities are responsible for adopting waste minimisation and management plans (WMMPs), and for solid waste collection and disposal (MFE, 2020). They also have the ability to develop by-laws for their district for the purpose of regulating waste management, trade waste and solid waste (Local Government Act 2002).

Outside the legislative framework identified in the New Zealand Waste Strategy, a number of non-government organisations are active in waste management and minimisation, along with private sector responses to provide waste management and minimisation services (such as recycling of materials, app software development, or waste consultancy). A sample of the key initiatives of these organisations are outlined as follows.

2.2 Current C&D waste initiatives

Waste is an issue of increasing concern for New Zealanders. A 2018 survey found that 50% of New Zealanders are very or extremely worried about the impacts of waste (Colmar Brunton, 2018).

2.2.1 General waste minimisation initiatives



This is evident in the number of waste management and minimisation initiatives that have been developed to respond to this concern. A sample of such initiatives relevant to this current research project include:

The WasteMINZ National Waste Data Framework, 2015. This developed definitions for waste data terms, protocols for collecting related waste data, and standard reporting indicators for territorial authorities (WasteMINZ, 2020). It was created in consultation with industry and with support from central, regional, and local government; however, did not include data reporting requirements specifically for C&D waste (WasteMINZ, 2015).



 The Territorial Authority Forum¹ of WasteMINZ released a Local Government Waste Management Manifesto (2018) to identify the waste management actions that government should prioritise. Again, however, this document did not specifically reference C&D waste (Territorial Authority Forum, 2018)

2.2.2 C&D waste minimisation initiatives



Aside from these general waste initiatives, those completed or underway to address C&D waste specifically include:

- Resource Efficiency in the Building and Related Industries (REBRI). This initiative commenced in 1995 as a collaborative effort between the (then) Auckland City Council and the Building Research Association of New Zealand (BRANZ). The purpose of REBRI was to undertake research and raise awareness of the issues of waste and the efficient use of resources in construction and demolition projects. REBRI was further extended in collaboration with stakeholders in 2003, 2009, and 2014. Today it provides a portal for information regarding C&D waste management, case studies, guidance, and tools (About REBRI, 2020).
- The New Zealand Green Building Council (NZGBC) operates voluntary building rating systems specifically developed for New Zealand, including Homestar (for new homes) and HomeFit (for existing homes)(NZGBC, 2020). Homestar awards credits for construction waste minimisation of up to just under 7% of the total points required for a 6-star Homestar rating (Green Star and Homestar Waste Management and Removal, 2020).
- In 2019 the NZ Ecolabelling Trust launched a voluntary C&D waste specification 'EC-59 C&D Waste Services'. The purpose of this specification is to encourage more innovative waste management practices within the building industry and reduce the amount of C&D waste going to landfill (Environmental Choice NZ, 2020).

¹ An officer-led Sector Group of WasteMINZ, including waste officers from 64 city and district councils from around New Zealand.



Some local government organisations provide information and knowledge sharing regarding C&D waste interventions. Christchurch City Council, for example, runs the Target Sustainability initiative providing support to Christchurch businesses to reduce waste and be energy and water efficient (CCC, 2020a). This includes the provision of a range of case studies for construction and demolition projects, identifying how construction waste was recycled as a learning resource for others (CCC, 2020b).

2.2.3 MFE consultation on reducing waste

MFE recently completed consultation on a suite of measures to reduce waste through a more effective landfill levy (MFE, 2020). The landfill levy consultation is based on two sets of proposals as described below.

2.2.3.1 Levy proposals relevant to C&D waste

MFE estimate that some 2.9 million tonnes of waste per annum is disposed of at approximately 22 construction and demolition fills across the country (MFE, 2020). Currently, there is no landfill levy applicable to C&D waste. If subject to the levy, sites such as construction and demolition fills would have an obligation to report waste quantities to MFE and pay a levy on the basis of reported waste disposed of. MFE's levy proposals with implications for C&D waste include:

- Applying the landfill levy to more landfills (including construction and demolition fills);
- Increasing the current landfill levy rate of \$0 for construction and demolition fills to a transitional rate of \$10 per tonne, and then a rate of \$20 per tonne by 2023; and
- 3. Increasing the current landfill levy rate of \$10 per tonne for municipal landfills (which may also accept some C&D waste) to a transitional rate of \$20-30 per tonne, and then a rate of \$50-60 per tonne by 2023 (MFE, 2020).



This means that the building and construction industry would face increased costs for any C&D waste that is disposed of to landfill, as opposed to being recovered or recycled. MFE consider that this approach is likely to incentivise the recovery and recycling of C&D waste (MFE, 2020).

2.2.3.2 Data proposals relevant to C&D waste

MFE also identify that there are significant gaps in data regarding the quantity and type of waste disposed of in New Zealand, as well as about the type and location of landfills (MFE, 2020). MFE therefore propose to update regulations under section 86 of the Waste Minimisation Act 2008 (the WMA) to address data inadequacies. Data proposals with implications for C&D waste include:

- Working with the waste sector and local government to develop a
 nationally consistent record of all waste disposal facilities in New
 Zealand, including their names, locations and (for landfills and cleanfills)
 the landfill classification.
- 2. Introducing regulations to require landfill and cleanfill sites (classes 1 5, which includes construction and demolition fills) and transfer stations to report activity source and geographic source data. Note that:
 - 'Activity source' refers to the type of activity that generates the waste or diverted material, and includes C&D waste.
 - 'Geographic source' would be based on local government boundaries.
 - MFE also considered requiring the reporting of composition data (the type of material included in the waste e.g. wood, paper etc). However, it did not include composition data in the regulatory update. Instead, MFE intend to gather landfill-specific composition data from landfills and transfer stations via periodic surveys. Surveys would be taken after gaining the agreement of relevant sites to enter their premises.

It is proposed that sites would report activity source and geographic source information on a monthly basis. Sites receiving less than 1,000 tonnes per year could request approval for an annual return (MFE, 2020).



At the time of writing this report, no decisions had been made on the levy and data proposals described. The implications of whether these proposals are adopted as consulted by MFE are discussed in Section 4.1.3.2.

3 Methodology

This section outlines the methodology followed to complete this research regarding C&D waste. It identifies the specific research questions posed, and the approach taken to answering them. The methodology remained agile over the course of the research, responding to findings to ensure that the research would be as useful to industry as possible.

3.1 Research questions

This research report has been structured to respond to the following questions:

- Is it currently possible to identify the volume and composition of C&D waste on a regional basis, across New Zealand? (Section 4.1).
- 2. What do stakeholders see as the main barriers to minimising current levels of C&D waste? (Section 4.2).
- 3. What do stakeholders consider to be the priority actions required to minimise current levels of C&D waste? (Section 4.3).

It is intended that the information contained in this report will provide a baseline level of understanding regarding each of the questions above. This could then inform any future policy, project, or research initiatives in relation to C&D waste, with a view to working together with a full range of stakeholders to explore, and action, opportunities for minimising the country's C&D waste-stream.

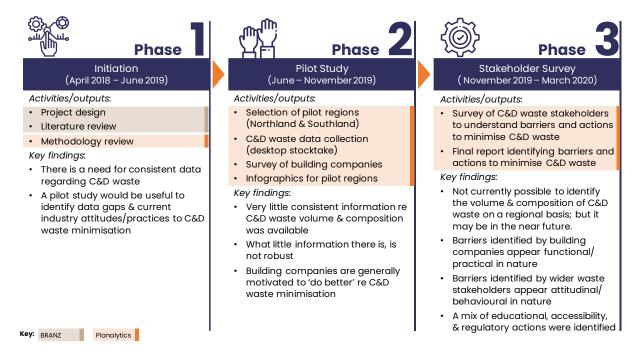
For the purposes of this report, 'stakeholders' as referenced in research questions 2 and 3 means any organisation or individual active in the building and construction industry or the waste management sector.



3.2 Project approach

This research project was completed in three phases over a two-year period, as identified in Figure 2. Each of these phases is described in the following sub-sections.

Figure 2: Project approach



3.2.1 Phase 1 Initiation

As part of Phase 1, BRANZ completed a literature review to obtain insight into C&D waste management in New Zealand. This included an outline of the legislative and strategic framework for waste management and minimisation, current practices and initiatives, and data availability. Some international comparisons were also used, where relevant to the New Zealand context.

A review of the original research methodology was also completed. This refined the methodology to be as effective and useful for the building and construction industry and stakeholders as possible. This work informed the design of Phase 2 of the research.



3.2.2 Phase 2 Pilot study

Phase 2 involved a pilot study of two regions, to understand what C&D waste data was currently available and to gauge industry attitudes and practices regarding C&D waste minimisation. The purpose of undertaking a pilot study of two regions was to test the methodology and understand the research findings, in order to determine the usefulness of rolling out the research to all regions in New Zealand.

Using a selection protocol agreed with BRANZ, Northland and Southland were identified as the two regions for inclusion in the pilot study. Both of these regions contain three territorial authorities each and have a clear regional boundary. It was important to have one region located in the North Island and one in the South Island, to ensure geographic representation.

3.2.2.1 Data collection

Table 1 identifies the agencies in Northland and Southland from which C&D waste information was requested, and what information was subsequently received.

Table 1: Pilot study information received

Agency	Information received		
Northland			
Far North District Council	Waste Assessment, November 2016		
	Waste Management & Minimisation Plan 2017 – 2023		
	 Far North District refuse transfer stations & community recycling centres (2018/19) 		
Kaipara District Council	Extract from 2008 General Bylaws, Part 4 Solid Waste		
	Kaipara District Waste Assessment, June 2016 (Tonkin & Taylor Ltd)		
	Waste Management & Minimisation Plan 2017/2022, November 2017		
Whangarei District Council	 Composition of Solid Waste for Whangarei District (draft), March 2017 (WasteNot Consulting) 		
	Whangarei District Waste Assessment, June 2017 (Tonkin & Taylor)		
	Waste Management & Minimisation Plan, September 2017		



Agency	Information received		
Northland Regional	Regional Policy Statement for Northland, May 2016 (May 2018)		
Council	Resource consent decision for Puwera Landfill, 20 April 2018		
Ministry for the	Material break down – Russell		
Environment	Material break down – Ahipara		
	Material break down – Northland Regional Landfill		
NZ Green Building Council	• Nil.		
Southland			
WasteNet ²	Solid Waste in Southland 2007, May 2008 (WasteNot Consulting)		
(c/- Invercargill City Council)	 Composition of Solid Waste in Southland Region, July 2011 (WasteNot Consulting) 		
	 WasteNet Southland Joint Waste Management Agreement, 13 October 2011 		
	Southland Region Waste Assessment, January 2012 (Morrison Low)		
	Southland Waste Management & Minimisation Plan 2012 – 2018		
	 Section 17A Service Delivery Review for WasteNet Southland, December 2016 (Morrison Low) 		
	A Year in Review 2016-2017: WasteNet Southland Annual Report		
	A Year in Review 2017-2018: WasteNet Southland Annual Report		
Environment Southland	Southland Regional Policy Statement 2017		
	 Proposed Southland Water and Land Plan Part A, 4 April 2018 (Decisions version) 		
	Discharge permits for six sites, 2003 – 2015		
	 Section 42A Report, Resource Consent Application considered under Delegated Authority for two sites, 2016 and 2018 		
Ministry for the Environment	Material break down – AB Lime, Invercargill		
NZ Green Building Council	• Nil.		

3.2.2.2 Survey of building companies

To complement the C&D data collection exercise, a survey of building companies in Northland and Southland was undertaken to gauge industry

² Invercargill City Council, Southland & Gore District Councils operate as WasteNet, a joint venture.



attitudes and practices regarding C&D waste minimisation. Although attracting a modest sample size of 40 respondents, this survey provided a snapshot of what was happening in the building industry in relation to waste minimisation from those handling C&D waste on a day-to-day basis.

The survey was made available online, and a survey invite was emailed to 125 building companies (77 in Northland and 48 in Southland) on 18 September 2019. A reminder email was then sent on 1 October 2019, and the survey closed on 9 October 2019. Respondents were provided with a \$30 Mitre 10 voucher in acknowledgement of their time.

As stated, a total of 40 responses to the survey were received. Of these:

- 25 (62%) were located in Northland and 15 (37%) in Southland.
- 35 (87%) worked in residential construction. The remainder worked in the commercial, industrial, and rural sectors.
- 16 (41%) described their role as manager and 11 (28%) described their role as builder.
- 21 (54%) had spent more than 20 years in the building industry and 12
 (31%) had spent 11 20 years in the building industry.

Survey respondents were also asked who they would go to if they had any questions regarding the recycling and reuse of C&D waste materials. A total of 20 respondents (28% of the total) advised that they would go to their local council.

3.2.2.3 Checkpoint

On completion of the pilot study, it was determined that due to the low level of C&D waste information available for the two pilot regions, collecting similar information for the 14 remaining regions in the country may not be particularly useful.

The survey of building companies, however, was extremely useful for providing insight into the barriers and actions considered necessary to minimise C&D waste in New Zealand. Given that local councils were



reported through the Phase 2 survey to be a key influencer regarding C&D waste minimisation, the methodology was reframed to include a survey of waste stakeholders, including primarily local government waste officers (as described in the following sub-section).

3.2.3 Phase 3 Stakeholder survey

Phase 3 of the research involved a survey to understand what waste stakeholders saw as the main barriers and priority actions to promote the recovery and reuse of C&D waste across the country.

As stated previously, local government waste officers were the primary survey audience. Prior to the survey being released, each council in New Zealand (78 in total) was approached via email and asked to provide contact details for their waste officers.

Given that the timing of the survey was concurrent with MFE's landfill levy consultation period, MFE were invited to review the survey questions before they were deployed. This was to ensure that the survey would not compromise the landfill levy consultation. MFE provided useful feedback which was incorporated into the final survey questions.

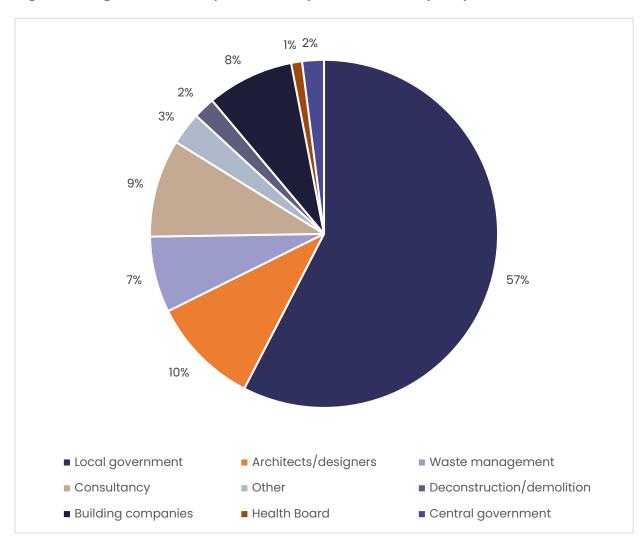
Once finalised, the survey was made available online and an invite was emailed to 115 stakeholders on 29 January 2020. This included 104 local and regional government waste officers and representatives from 11 stakeholder agencies. Invitees were encouraged to pass the survey invite on to any further waste stakeholders (including landfill and cleanfill operators etc) in their region. This snowball approach to survey recruitment ensured a wide distribution of the online survey invite to relevant participants. A reminder email was then sent on 10 February 2020 and the survey closed on 19 February 2020. No participation incentives were provided for this survey.



A total of 96 responses to the survey were received. Of these:

- 16 (15%) were located in Hawke's Bay, 16 (15%) in Otago, and 11 (10%) in Greater Wellington. The least represented regions were Gisborne, Tasman, and West Coast, with 1% of respondents each.
- 48 (24%) described the area within which they worked as waste minimisation, 35 (17%) as waste management/operations, 29 (14%) as waste policy or strategy; and 19 (9%) as building industry (specifier, architect, builder etc.)
- 88 respondents provided the name of the organisation they worked for, as represented in Figure 3.

Figure 3: Organisations represented by Phase 3 survey respondents





4 Findings

Answers to the research questions identified in Section 3.1 of this report were identified through the methodology outlined in Section 3.2. This section now discusses the findings per research question in order to understand the current information available regarding C&D waste in two pilot regions and the barriers and actions necessary to promote meaningful C&D waste minimisation across New Zealand.

4.1 Is it currently possible to identify the volume and composition of C&D waste on a regional basis, across New Zealand?

As noted by MFE, there is significant room for improvement across the country on the data that is collected on waste. And by default, *how* it is collected. Better waste data would make it easier to identify opportunities and assess the effectiveness of waste minimisation measures (MFE, 220).

This is especially applicable to C&D waste. As identified in Section 2.2 of this report, C&D waste data has not always been separated out from general waste reporting, for example in the WasteMINZ Waste Data Framework (WasteMINZ, 2015). This may be because C&D waste data can be difficult to collect. For example, C&D waste can be mixed with other types of waste and therefore cannot always be accurately tracked or identified at the final point of disposal (i.e. if collected at a transfer station and transported to landfill in loads of mixed waste) (MFE, 2020).

This first research question therefore seeks to understand if it is currently possible to identify the volume and composition of C&D waste data on a region by region basis, across New Zealand. The following sub-sections describe the key findings from each stage of research completed, in order to answer this question. This was primarily achieved through a pilot study data collection exercise (Section 4.1.1) and a survey of waste industry stakeholders (Section 4.1.2).



4.1.1 Pilot study data collection findings

As outlined in Section 3.2.2.1 of this report, a data collection exercise was undertaken as part of the pilot study that informed this research. The pilot study analysed the waste data available³ for two regions (Northland and Southland) to ascertain the volume and composition characteristics of C&D waste in those regions.

4.1.1.1 Reporting of C&D waste data between pilot regions was not consistent

Analysis of available waste data available indicated that information regarding the volume and composition of C&D waste in the two pilot regions could not be reliably extracted. The variation in C&D data collection processes and reporting procedures between waste stakeholders meant that no consistent evidence base of waste data, let alone C&D waste data, was available.

The high-level outcomes of the pilot study data collection exercise are outlined in Table 2. This includes a traffic light system identifying what C&D waste reporting statistics were available per region. Where:

- red indicates that no data was available from any of the territorial authorities in the region;
- orange indicates that data was available from some of the territorial authorities in the region; and
- green indicates that data was available for all of the territorial authorities in the region.

Additional outcomes of the pilot study data collection exercise are included in infographic-format in Appendix 1 of this report.

³ District Council Waste Management and Minimisation Plans and Waste Assessments; Regional Council Regional Policy Statements and Landfill resource consent decisions, and MFE Material Break Down data from Class 1 Landfills.



Table 2: Information available from pilot study data collection exercise

C&D waste reporting statistic	Northland region (3 territorial authorities)	Southland region (3 territorial authorities)
Tonnage of C&D waste entering Council operated facilities	•	•
% C&D of total waste entering Council operated facilities	•	•
For monitored facilities where C&D waste is accepted; C&D as % of total waste stream	•	•
Material contributing the largest % of total C&D waste	•	•
Waste Assessment prepared in the last 10 years	•	•
Solid Waste Analysis Protocol (SWAP) composition data	•	•
Waste Management & Minimisation Plan prepared in the last 10 years	•	•

Table 2 illustrates the inconsistency of C&D waste information available between the two pilot regions. The three territorial authorities (TAs) in Northland operate independently in relation to waste management, and offer varying levels of consistent, publicly available information regarding C&D waste. The volume and composition of C&D waste in Northland could not be ascertained from the information reviewed.

The three TAs in Southland operate as a joint venture (WasteNet Southland) in relation to waste management and minimisation activities (WasteNet Southland, 2011). This meant that reporting on C&D waste data was generally consistent across the three TAs, providing a more reliable understanding of C&D waste characteristics for Southland. The weight and composition of C&D waste in Southland could therefore be ascertained, although volume was not directly indicated.



4.1.1.2 Although some data regarding C&D waste weight and composition was available for the pilot regions, it may not necessarily be reliable

The pilot study data collection exercise also identified a number of issues in current C&D waste data reporting for the two regions analysed. These issues meant that the although some data regarding C&D weight and composition is available for the pilot regions, it may not necessarily be reliable.

The primary data collection issues noted through the pilot study exercise included:

- Solid Waste Analysis Protocol (SWAP) composition surveys were the main source of information regarding C&D waste composition and weight. However:
 - SWAP reports were largely outdated⁴;
 - MFE's SWAP Summary Procedures document indicates that as a minimum, surveys should collect data covering a period of one week (MFE, 2002). This is a short reporting period and may not be representative of seasonal fluctuations, peaks, or spikes in the amount and type of C&D waste being disposed of.
 - None of the TAs had commissioned waste audits outside the SWAP process.
- 2. Material breakdown data was not consistent between landfills, and included data for Class 1 Landfills only (i.e. not all types of landfills). The material breakdown data per landfill reported on tonnage of waste disposed of by material type (i.e. by weight). It did not include data on volume or composition beyond identification as C&D waste. Of the four landfills for which material breakdown data was analysed:
 - o Two landfills did not report on C&D waste at all;
 - One landfill reported on C&D waste sporadically (i.e. not over consecutive time periods); and

⁴ Two of the TAs in the pilot study did not have a publicly available SWAP report less than 10 years old, one had a SWAP report dated 2011, and one had a SWAP report dated 2017



- One landfill reported on C&D waste consistently, but has now been closed.
- 3. Conditions of regional council resource consents (discharge permits) granted for landfills generally required the consent holder (usually the landfill operator) to keep a record of all incoming solid waste and cleanfill material. This included details such as source, description and quantity of material. Neither regional council included in the pilot study provided this information, potentially indicating that it may not available and/or accurate.
- 4. Landfill data alone is unlikely to account for all C&D waste being generated; as some C&D waste may be taken to cleanfills or recycling facilities. In addition, C&D waste could potentially be taken to a landfill, cleanfill or recycling facility outside of the regional boundary in question.

In summary, the pilot study data collection exercise found that it was not possible to consistently identify the volume and composition of C&D waste for two pilot regions from available information. This supposition was tested further in a survey of waste stakeholders completed in Phase 3 of this research, as summarised in the following sub-section.

4.1.2 Stakeholder survey findings

As outlined in Section 3.2.3 of this report, a survey of waste stakeholders was also completed to inform this research. This survey attracted respondents from every region in New Zealand, and included questions regarding the collection of C&D waste data. Responses to these survey questions provide useful insight into current attitudes and practices of stakeholders towards C&D waste data collection.

4.1.2.1 The majority of waste stakeholders do not regularly collect C&D waste data

Of the 83 responses to the question "does your organisation (or its contractors) regularly collect data specifically regarding C&D waste?", over



half of the respondents (59%) indicated that they did not. A further 24% answered yes, they did regularly collect C&D waste data; while 17% indicated that this question was not applicable to them.

The respondents who indicated that yes, they did regularly collect C&D waste data, were then asked what type of data they collected. The results of this question are identified in Figure 4. By far the largest type of data collected, at 41%, was volume of C&D waste. This was followed by composition of C&D waste (26%), then source location and weight at 13% each.

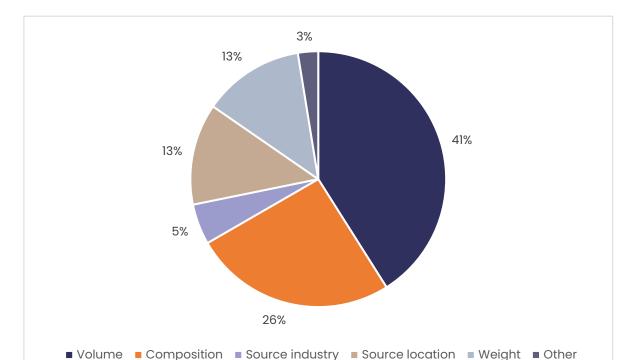


Figure 4: Type of C&D waste data collected

Respondents who indicated that they did regularly collect C&D waste data were located in eight regions across the country, or nationwide. Of the regions that were not included in the affirmative responses to this question, i.e. they did not regularly collect C&D waste data, half were located in the North Island and half were located in the South Island.



4.1.2.2 The majority of waste stakeholders that did regularly collect C&D waste data found it useful

Of the respondents who answered that they did regularly collect C&D waste data, 95% indicated that this data was useful for influencing their future business practices. This included 47% who found it 'extremely useful' and 47% who found it 'somewhat useful'. Only one respondent (5%) indicated that they did not find regular C&D waste data collection useful to their future business practices.

In summary, the stakeholder survey found that a quarter of respondents regularly collected C&D waste data and of the data collected, volume of C&D waste was the most reported type of data, followed by composition.

These findings suggest that it may be difficult, at the current time, to identify the volume and composition of C&D waste on a regional basis, across New Zealand. This is because not all regions are regularly collecting C&D waste data, although there was a clear response from those that are doing so, that it is useful for influencing future business practices.

4.1.3 Summary

4.1.3.1 It is not currently possible to identify the volume and composition of C&D waste on a regional basis, across New Zealand

The first research question posed in this report seeks to understand if it is currently possible to identify the volume and composition of C&D waste on a regional basis, across New Zealand. As outlined in the preceding subsections the answer to this is no, not at the current time.

The data collection exercise undertaken for two pilot regions indicated that although some data regarding C&D waste was available, it was not consistent between regions and may not be reliable. This was corroborated by the survey of waste industry stakeholders also completed as part of this research. This survey found that only a quarter of stakeholders regularly



collect C&D waste data and of these, discrepancies exist as to the type of data collected. (Although volume and composition was the most commonly collected type of C&D waste data, of those who did so). Interestingly, however, the vast majority (95%) of stakeholders who did regularly collect C&D waste data found it useful for influencing business practices.

4.1.3.2 It is possible that we might be able to better understand regional characteristics of C&D waste in the near future

In the future, however, it may well be possible to identify at least the volume (or weight) of C&D waste on a regional basis, across New Zealand. MFE's recent consultation document on reducing waste (through a more effective landfill levy) proposes to address the deficiencies in current collection and reporting of waste data, including C&D waste data (MFE, 2020).

If adopted, the data proposals within MFE's consultation document would trigger the introduction of regulations under section 86 of the Waste Minimisation Act 2008 (the WMA) to require:

- A record of landfills, cleanfills and transfer stations across the country.
 This includes C&D fills (Class 2);
- Reporting on activity source and geographic source data by landfill and cleanfill sites and transfer stations. It is intended that activity source data would include C&D waste.
- Information from territorial authorities regarding levy spending and their performance in achieving waste minimisation outcomes (MFE, 2020).

At the time of writing this report, it is unclear whether these data proposals will be passed into legislation and in what format. If passed, the regulations are proposed to take effect from 1 July 2021. MFE identify that more comprehensive and consistent national data on waste will allow central and local government and the private sector to better prioritise, plan and execute activities to reduce waste and move to a circular economy (MFE 2020). This is equally applicable to C&D waste specifically.



The proposed changes to the WMA are therefore likely to improve the availability and reliability of C&D waste data across New Zealand from the current benchmark identified through this research. Proposals may enable the identification of the volume of C&D waste on a regional basis across New Zealand, however, may not necessarily enable the identification of C&D waste composition. This is because composition is not included in the data proposals. Instead, MFE indicate that the Government's proposal is that landfill-specific composition data would be collected from landfills and transfer stations via periodic surveys (MFE, 2020).

Notwithstanding, the findings in relation to this research question indicate that any improvement in the availability and reliability of waste data (including C&D waste) would be beneficial. By understanding the quantity and type of C&D waste entering our landfills, we will be in a better position to develop effective waste minimisation practices and increase diversion rates.

4.2 What are the main barriers to minimising current levels of C&D waste?

The research completed for this project relied on stakeholders to identify specifically what they saw as the main barriers to minimising current levels of C&D waste across the country. Information was obtained via two surveys, one of building companies (in Northland and Southland), and one of wider waste sector stakeholders. Further specific details regarding survey respondents are included in Section 3 of this report.

The surveys provided a snapshot of current industry opinion regarding the main barriers to minimising current levels of C&D waste across New Zealand. This provides a rich information source for organisations active in waste management and policy-making to understand, and overcome, barriers to effective C&D waste minimisation.

The findings from each of these surveys is outlined and discussed in the following sub-sections. Separating findings from building companies and



findings from waste sector stakeholders provides an opportunity to compare and contrast emerging themes from each sector. This will inform any later discussion of actions required to overcome identified barriers to C&D waste minimisation.

4.2.1 Barriers to C&D waste minimisation identified by building companies

A small sample of 25 survey responses from building companies (17 from Northland and eight from Southland) identified the following barriers to C&D waste minimisation:

- Lack of space to store recyclable or reusable waste materials on-site (28% of responses);
- Lack of facilities that will take C&D waste materials for recycling or reuse (24% of responses);
- Ease of throwing everything in a skip (24% of responses); and
- Additional time required to separate waste materials (20% of responses).

Interestingly, only one respondent identified a lack of knowledge as a barrier to C&D waste minimisation ("we don't know what waste material is recyclable or reusable, and what's not").

The survey of building companies in Northland and Southland also asked if any transfer stations or waste facilities in those areas accepted construction and demolition waste for recycling and reuse. This is particularly interesting given the regional locations of these building companies, generally away from main centres which may reasonably be expected to have a wider range of facilities that accept diverted C&D waste.

In reply to the question regarding the availability of C&D waste recycling and reuse facilities in Northland and Southland:

 39% answered yes, transfer stations or waste facilities in their area accepted construction and demolition waste for recycling and reuse;



- 36% answered no, transfer stations or waste facilities in their area did not accept construction and demolition waste for recycling and reuse;
 and
- 25% indicated that they did not know if transfer stations or waste facilities in their area accepted construction and demolition waste for recycling and reuse.

This shows that 61% of building companies did not have, or did not know if they have, transfer stations or waste facilities in their areas that accepted construction and demolition waste for recycling and reuse. As well as reinforcing the barrier of lack of available facilities for C&D waste diversion, this indicates a potential lack of knowledge regarding the existence of facilities where C&D waste could be taken for recycling and reuse. This highlights a potential waste minimisation education opportunity, as discussed further in Section 5.2.

The pilot survey of building companies in Northland and Southland also indicated a potential barrier around translating willingness to minimise C&D waste into action. For example, the 83% of building companies that thought the recycling and reuse of C&D waste materials was a good idea, did not correlate with the 62% who always, or sometimes, separated out waste materials on-site. Therefore some building companies were willing to minimise C&D waste, but did not actually take the next step to put this into practice. Providing the building industry with the tools it needs to translate willingness into action could therefore be considered within a wider framework to promote C&D waste minimisation.

Note that infographics illustrating the survey outcomes for Northland and Southland are included in Appendix 1 of this report.

4.2.2 Barriers to C&D waste minimisation identified by waste stakeholders

The survey deployed to wider waste stakeholders included a specific question regarding barriers to C&D waste minimisation. This included nine pre-populated answers which respondents could select, along with a free-



text field to identify any other barriers not included in the pre-populated list. Respondents were able to select as many answers as they needed.

Of the 96 respondents to the waste stakeholder survey, 412 selections were made to the barriers to C&D minimisation question. This indicates a high level of engagement, with each respondent selecting just over four answers each on average.

The main barriers to C&D waste minimisation selected by waste stakeholders included:

- Lack of incentives to minimise C&D waste (16% of responses);
- Landfilling of C&D waste is the cheapest option to dispose of bulk C&D waste (15% of responses);
- Building industry apathy/lack of willingness to minimise C&D waste (13% of responses);
- Lack of understanding regarding which C&D waste materials can be recycled and reused, and those which cannot (13% of responses);
- Buildings are not designed to minimise levels of C&D waste (11% of responses);
- There are not enough waste facilities in my region that accept C&D waste and/or it is too far to travel to C&D recycling facilities (10% of responses);
- Insufficient local or central government funding to minimise C&D waste (9% of responses);
- Lack of data to measure levels of C&D waste; we don't know if levels are increasing or decreasing (8% of responses);
- There are no barriers, our current levels of C&D waste are okay (1%);
 and
- Other reasons (3% of responses).

A total of 14 respondents selected 'other' and provided additional comments in a free-text field. From these free-text comments, two additional themes (or barriers) emerged. These included:



- Lack of space for the onsite sorting of materials, and related issues around the time, training, and availability of labour to undertake this task.
- Lack of information and infrastructure as a further barrier to minimising C&D waste. These responses referenced the limited information available regarding options for minimising C&D waste, and also discussed specific regulatory issues, such as building regulation restrictions around the reuse of materials.

The cost of recycling and/or reusing C&D waste emerged as a recurring barrier in the survey responses received. Lack of incentives to minimise C&D waste (when framed as financial incentives) and the identification of landfilling as the cheapest option to dispose of bulk C&D waste accounted for 31% of responses. Time (and therefore cost) to recycle and reuse C&D waste materials was also identified as a barrier. One respondent summarised this barrier as follows: 'I think time and cost makes it [C&D waste] easier to dispose of rather than sort'.

Of the barriers noted, it is also interesting that building industry apathy and/or lack of willingness to minimise C&D waste was indicated by 13% of respondents as a barrier to C&D waste minimisation. An earlier question in the waste stakeholder survey had specifically asked if, in the respondents opinion, there is a general willingness from the building and construction industry to minimise volumes of C&D waste.

Answers to this question had identified that exactly 50% of respondents considered that there is a general willingness from the building and construction industry to minimise volumes of C&D waste. This means that the remaining 50% of waste sector stakeholders did *not* think there is a willingness from industry to minimise volumes of C&D waste.

Themes that emerged from the survey of wider sector stakeholders on this topic included that:



- There is willingness, but it is currently limited in its scope and application. One respondent noted that "individuals and businesses are waking up to the fact they need to do more to reduce their carbon footprint through waste reduction".
- More support and information for the building industry is needed. One respondent stated that "I think there is a willingness, but there is not the infrastructure or systems to support it".
- Time and cost may impact the willingness of the building industry to minimise C&D waste. One respondent stated that "it [recycling and recovery] is more difficult and takes time". Another noted that on building sites, "time is short and wages are high".
- There is a lack of incentives for the building industry to minimise volumes of C&D waste. One respondent stated that "the industry is incentivised to use low-cost, quick-turn-around solutions like landfill".
- C&D waste minimisation is seen as too difficult by many in the building industry. One respondent summed this up by stating "things might be slowly changing but for many it (waste minimisation) is in the too-hard basket".

Opportunities exist to mobilise the willingness of the building and construction industry to minimise C&D waste. Addressing the barriers identified in this sub-section could, for example, increase the ability (and potentially, the willingness) of building companies to minimise C&D waste.

4.2.3 Commonality in identification of barriers to C&D waste minimisation

The barriers to C&D waste minimisation identified by building companies have some similarities to those identified by wider waste stakeholders, but they also differ. Points of commonality between both building companies and wider waste stakeholders include primarily, lack of space onsite for sorting materials and lack of time to sort materials, with the associated cost of increased time spent undertaking such activities.



In addition, lack of knowledge could also be contemplated as a commonly identified barrier to C&D waste minimisation, although this was not directly acknowledged by the building industry. Only one respondent to the survey of building companies identified lack of knowledge as a barrier to C&D waste minimisation. However, in a later question testing knowledge of whether transfer stations or waste facilities in their area accepted diverted C&D waste, 25% of respondents indicated that they did not know. This compared to the survey of wider waste stakeholders who identified a lack of understanding regarding the diversion potential of C&D waste as the fourth most common barrier to waste minimisation. Knowledge therefore appears to be a barrier to C&D waste minimisation, albeit one that remains unacknowledged.

Points of difference in the identification of barriers to C&D waste minimisation between building companies and wider waste stakeholders could be summarised as follow.

- Barriers identified by building companies appear more functional, or practical, in nature. For example, lack of space on-site to sort materials and lack of facilities that will take waste materials for recycling or reuse.
- Barriers identified by wider waste stakeholders, in contrast, appear more attitudinal, or behavioural, in nature. For example, lack of incentives to minimise C&D waste and apathy/ lack of willingness to minimise C&D waste.

Higher levels of willingness to minimise C&D waste were identified by building companies (83% of respondents); although with a lower conversion rate to those actually separating out waste materials on-site (62% of respondents). This compared to an even split of opinion between waste stakeholders as to the general willingness of the building industry to minimise C&D waste (50:50).

The commonalities and differences in the identification of barriers to C&D waste minimisation yield rich insights into the mindsets of both building companies and wider waste stakeholders. This indicates that any actions



taken to promote C&D waste minimisation must appeal to all parties. For example, actions should include practical, on-site considerations as well as behavioural or more policy-focused responses.

4.2.4 Summary

The second research question posed in this report seeks to understand what stakeholders see as the main barriers to minimising current levels of C&D waste. As outlined in the preceding sub-sections, the main barriers to C&D waste minimisation identified through the research can be summarised as:

- Opportunity ('lack of space on-site', 'lack of facilities that will take C&D waste materials for recycling and reuse');
- Cost and incentives ('lack of incentives to minimise C&D waste', 'ease
 of throwing everything in a skip', and 'landfilling of C&D waste being
 the cheapest disposal option'); and
- Knowledge ('lack of understanding regarding which C&D waste materials can be recycled and reused, and those which cannot').

Actions to address these barriers are discussed further in the following section.

4.3 What are the priority actions required to minimise current levels of C&D waste?

The research completed for this project relied on stakeholders to identify specifically what they saw as the priority actions required to minimise current levels of C&D waste across the country. As discussed in the preceding section, information was obtained via two surveys, one of building companies (in Northland and Southland), and one of wider waste sector stakeholders.

The actions identified to minimise C&D waste from each of these surveys are discussed in the following sub-sections.



4.3.1 Actions to promote C&D waste minimisation identified by building companies

The survey deployed to building companies included a question regarding which measures respondents considered would encourage the recycling and reuse of C&D waste. This included seven pre-populated answers which respondents could select, along with a free-text field to identify any measures not included in the pre-populated list. Respondents were able to select as many answers as they needed. Of the 25 respondents to the survey of building companies, 92 selections were made to this question. This indicates a good level of engagement, with each respondent selecting just over three and a half answers each, on average.

The main actions (or measures) to C&D waste minimisation selected by building companies included:

- If someone came and collected recyclable and reusable waste materials from our build site (27% of responses);
- If we had separate skips on site for recyclable and reusable waste materials (25% of responses);
- If we knew what waste material is recyclable or reusable, and what's not (16% of responses);
- If it cost a lot of money to throw everything away (i.e. if it was more cost effective to separate out recyclable and reusable waste materials) (11% of responses);
- If we knew where to take waste materials for recycling or reuse (10% of responses);
- If the boss tells us we have to (5% of responses); and
- Other reasons (5% of responses).

A total of five respondents selected 'other' and provided additional comments in a free-text field. These responses can be summarised into the following:

Concerns around whether insurance applied to reused materials
 ("due to product specifications, building code regulations and the 10")



year builder warranty on buildings, I don't think insurance would cover reused materials). This suggests an action to provide clarity to the building industry around the implications of reusing materials.

- Re-thinking the way waste is collected on site ("remove skips from site
 it encourages waste").
- Providing more recycling and reuse options for C&D waste ("more accessible facilities for all the different types of recyclable waste")

Some building company respondents readily acknowledged the benefits of C&D waste minimisation, with comments such as "[we are] already into recycling – there are some benefits to us and some to the community, plus the obvious benefits to the planet" and "less waste = better efficiency = more profit". This indicates that from the small sample of building companies surveyed, there may be appetite to implement actions to minimise C&D waste and achieve operational and financial efficiencies.

4.3.2 Actions to promote C&D waste minimisation identified by waste stakeholders

The survey deployed to wider waste stakeholders included a series of questions regarding actions to promote C&D waste minimisation.

The first of these questions asked which of the following actions respondents thought could promote the minimisation of C&D waste in their region. This included 14 pre-populated answers which respondents could select, along with a free-text field to identify any other actions not included in the pre-populated list. Respondents were able to select as many answers as they needed.

Of the 96 respondents to the waste stakeholder survey, 596 selections were made in response to this question. This indicates a very high level of engagement, with each respondent selecting just over six answers each on average.



The main actions to promote C&D waste minimisation selected by waste stakeholders included:

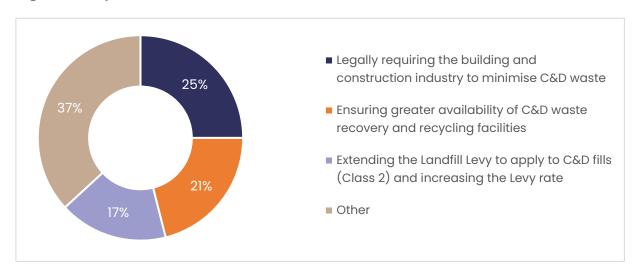
- Ensuring greater availability of C&D waste recovery and recycling facilities (11% of responses);
- Creating 'take-back' schemes or return depots, where material retailers provide drop-off facilities for C&D waste materials; which are then recycled or re-used (10% of responses);
- Extending the landfill levy to apply to C&D fills (Class 2) and increasing the Levy rate (as per the levy proposals contained in the Ministry for the Environment's landfill levy consultation) (9% of responses);
- Legally requiring the building and construction industry to minimise
 C&D waste (9% of responses);
- Using conditions on resource and building consents to encourage or require C&D waste minimisation for consented development (9% of responses);
- Providing targeted training and education opportunities to architects, designers, product manufacturers and builders on how to minimise C&D waste (8% of responses);
- Improving the collection and reporting of C&D waste data to show longer term trends and strategically target waste minimisation interventions (8% of responses);
- Decreasing the cost of C&D waste recycling or reuse (7% of responses);
- Using bylaws to encourage or require waste collectors and landfill/cleanfill operators to recycle and reuse C&D waste (7%);
- Promoting alternate uses of C&D waste (i.e. incineration of burnable C&D wood waste to generate energy), where appropriate (6% of responses);
- Encouraging the use of Homestar or other accreditation schemes to minimise C&D waste at source and/or at the design stage (6% of responses);
- Financially subsidising C&D waste recyclers to be more cost competitive with cleanfill and landfill disposal costs (6% of responses);



- Encouraging the uptake of the NZ Ecolabelling Trust's C&D waste specification EC-59 (4% of responses);
- None of the above, C&D waste minimisation should be left to market forces (0.2% of responses); and
- Other reasons (2% of responses).

To further test the prioritisation of actions to promote C&D waste minimisation, waste stakeholders were then asked to identify the single most important action that should be prioritised to minimise current levels of C&D waste. Respondents were able to select one answer only. The purpose of this question was to compare results to the previous question to determine if, when only one action was able to be selected, what action respondents prioritised. Figure 5 identifies the top three actions selected by survey respondents.

Figure 5: Top three actions to minimise current levels of C&D waste



Interestingly, when given only one opportunity to select an action, respondents prioritised actions differently than when they could select as many actions as they liked. Differences included:

Legally requiring the building and construction industry to minimise
 C&D waste increased from 9% of responses to 25%;



- Ensuring greater availability of C&D waste recovery and recycling facilities (previously the most selected action) increased from 11% of responses to 21%;
- Extending the landfill levy to apply to C&D fills (Class 2) and increasing the levy rate increased from 9% of responses to 17%; and
- Creating 'take-back' schemes or return depots, where material retailers provide drop-off facilities for C&D waste materials, was not included in the list of the top three actions, decreasing from 10% of responses to 4%.

Of these top three actions to minimise current C&D waste levels, both legally requiring the building and construction industry to minimise C&D waste (25% of responses) and extending the landfill levy to apply to C&D fills and increasing the levy rate (17% of responses) are regulatory in nature. While ensuring greater availability of C&D waste recovery and recycling facilities (21% of responses) speaks more to creating opportunities to divert C&D waste.

The regulatory focus of these responses could, however, be due to the nature of the organisations within which a number of waste stakeholders are currently engaged (59% of respondents work in central and local government). This preference for regulation may therefore be reflective of the tools available to 59% of respondents, or potentially due to past experience in waste management initiatives (for example, possible lack of success of previous non-regulatory waste minimisation interventions).

Finally, waste stakeholders were asked if they could change one thing tomorrow about how C&D waste is currently managed in their region, what would it be? This was a free-text answer where respondents could write anything they liked, without an pre-populated options to select from.

75 responses were received to this question, from which three main themes emerged. These included:



- More, and better, facilities for the recycling and reuse of C&D waste (27% of responses). This identified the need for centralised locations where C&D waste could be processed, and also separate bins available for hire to deposit and store recyclable and reusable items.
- More rules and regulations on how C&D waste is currently managed (20% of responses). This included the call for changes to legislation and policies that enforce and encourage the building industry to reduce and/or recycle. This theme also included changes to planning and regulations, such as resource consent processes to enforce C&D waste recovery and prevent it from going to landfill.
- Greater awareness around managing C&D waste (11% of responses), including more training and education programmes on the topic.

Interestingly, the answer to this question yielded three similar themes to early survey questions regarding actions required to minimise C&D waste, therefore corroborating these findings. In summary, these themes included more C&D waste diversion facilities, more regulation, and greater awareness. These actions are now contextualised against the findings from the survey of building companies, in the following sub-section.

4.3.3 Commonality in identification of actions to promote C&D waste minimisation

Actions to promote C&D waste minimisation identified by building companies have some similarities to those identified by wider waste stakeholders, but similarly to the earlier discussion re barriers to minimisation, they also differ.

Points of commonality between both building companies and wider waste stakeholders included:

- Increasing education and awareness regarding C&D waste minimisation opportunities; and
- Providing more recycling and reuse options for C&D waste.



Points of difference in the identification of actions to minimise C&D waste between building companies and wider waste stakeholders included:

- Actions identified by building companies were again more functional, or practical, in nature. For example, third-party removal of recyclable and reusable waste materials from build sites and separate skips onsite for recyclable and reusable waste materials.
- Actions identified by wider waste stakeholders, in contrast, were regulatory in nature. For example, legally requiring the building and construction industry to minimise C&D waste, and extending the landfill levy to apply to C&D fills and increasing the levy rate.

The commonalities and differences in the identification of actions to minimise C&D waste minimisation again yields useful insights. They indicate that a range of actions to minimise C&D waste may be required, rather than a 'one size fits all' approach. As noted by two respondents to the waste stakeholders survey "it is going to take a multifaceted approach to solve the problem" and "I think it requires working towards a multipronged approach tackling it from all directions".

4.3.4 Summary

The third research question posed in this report seeks to understand what stakeholders consider to be the priority actions required to minimise current levels of C&D waste.

4.3.4.1 Actions identified through survey findings

As outlined in Section 4.3.1, the most commonly identified actions to promote C&D waste minimisation by building companies can be summarised as:

- On-site opportunity ('if someone came and collected recyclable and reusable waste materials from our build sites', and 'if we had separate skips on site for recyclable and reusable waste materials'); and
- Knowledge ('if we knew what waste material is recyclable or reusable, and what's not').



As outlined in Section 4.3.2, the most commonly identified actions to promote C&D waste minimisation by wider waste stakeholders can be summarised as:

- Regulatory ('legally requiring the building and construction industry to minimise C&D waste', 'extending the landfill levy to apply to C&D fills and increasing the levy rate', and 'more rules and regulations on how C&D waste is currently managed');
- Off-site opportunity ('ensuring greater availability of C&D waste recovery and recycling facilities', and 'more and better facilities for the recycling and reuse of C&D waste'); and
- Knowledge ('greater awareness around managing C&D waste').

4.3.4.2 Opportunities to convert identified actions into interventions

The main actions of increasing opportunities for the recycling and reuse of C&D waste materials (both on-site and off-site) and increasing knowledge regarding the recycling potential of C&D waste materials, provide clear direction to industry, policymakers, and the market regarding potential interventions to minimise C&D waste across the country. For example:

- Business opportunities regarding collection of recyclable and reusable C&D waste materials from building sites, and/or provision and collection of separate sorting skips or other containers from sites. (Where the volume and proximity of building sites is sufficient to ensure business viability).
- 2. Knowledge transfer opportunities, to provide the building and construction industry with the information it needs to understand what C&D waste materials are recyclable or reusable and what are not, what recycling facilities exist in different regions across the country, and what the business case is for recycling and reuse as opposed of disposal to landfill. It will be particularly relevant if MFE's current proposals to change the landfill levy come into effect, as this will increase the cost of disposing of C&D waste to landfill and cleanfills.



The preference for increased regulation indicated by waste sector stakeholders could also be considered within a wider framework of C&D waste minimisation interventions. However, the timing of this is dependent on the outcome of MFE's landfill levy consultation. It may be useful, for example, for the implications of any changes to the landfill levy to be understood, before any additional regulatory measures are put in place. This is because the proposed changes to the landfill levy may result in expected (greater recycling rates for C&D waste materials) and/or unexpected (increased illegal dumping of C&D waste materials) behaviour changes which could inform any additional future regulation.

These findings, their implications for the building and construction sector, and potential future research initiatives regarding C&D waste are now outlined further in the following section.

5 Conclusion

5.1 Findings

5.1.1 Research question 1

The first research question sought to understand if it is currently possible to identify the volume and composition of C&D waste on a regional basis across New Zealand. It was apparent from the research that it is not currently possible to identify the volume and composition of C&D waste region by region.

The data collection exercise undertaken for two pilot regions indicated that although some data regarding C&D waste was available, it was not consistent between regions and may not be reliable. This was corroborated by the survey of waste industry stakeholders. This survey found that only a quarter of stakeholders regularly collect C&D waste data and of these, discrepancies exist as to the type of data collected. Interestingly, however,



the vast majority (95%) of stakeholders who did regularly collect C&D waste data found it useful for influencing business practices.

In the future, it may well be possible to identify at least the volume (or weight) of C&D waste on a regional basis, across New Zealand. MFE's recent consultation document on reducing waste (through a more effective landfill levy) proposes to address the deficiencies in current collection and reporting of waste data, including C&D waste data (MFE, 2020).

If the proposed changes to the WMA take effect, they will likely improve the availability and reliability of C&D waste data across New Zealand from the current benchmark identified through this research. At this point in time, any improvement in the availability and reliability of waste data (including C&D waste) would be beneficial. By understanding the quantity and type of C&D waste entering our landfills, we will be in a better position to develop effective waste minimisation practices and increase diversion rates.

5.1.2 Research question 2

The second research question sought to understand what building and construction industry and waste management stakeholders saw as the main barriers to minimising current levels of C&D waste. Through the two surveys completed, the main barriers to C&D waste minimisation identified included:

- Opportunity ('lack of space on-site', 'lack of facilities that will take C&D waste materials for recycling and reuse');
- Cost and incentives ('lack of incentives to minimise C&D waste', 'ease
 of throwing everything in a skip', and 'landfilling of C&D waste being
 the cheapest disposal option'); and
- Knowledge ('lack of understanding regarding which C&D waste materials can be recycled and reused, and those which cannot').

Understanding these barriers to C&D waste minimisation will assist in the development of responses to overcome them, and ultimately improve the performance of the sector (Arbarca-Guerrero et.al., 2017).



5.1.3 Research question 3

The third research question sought to understand what stakeholders consider to be the priority actions required to minimise current levels of C&D waste. The most commonly identified actions to promote C&D waste minimisation included:

- On-site opportunity ('if someone came and collected recyclable and reusable waste materials from our build sites', and 'if we had separate skips on site for recyclable and reusable waste materials'); and
- Off-site opportunity ('ensuring greater availability of C&D waste recovery and recycling facilities', and 'more and better facilities for the recycling and reuse of C&D waste');
- Regulatory ('legally requiring the building and construction industry to minimise C&D waste', 'extending the landfill levy to apply to C&D fills and increasing the levy rate', and 'more rules and regulations on how C&D waste is currently managed'); and
- Knowledge ('if we knew what waste material is recyclable or reusable, and what's not' and 'greater awareness around managing C&D waste').

These actions provide clear indications to industry, policymakers, and the market regarding potential interventions to minimise C&D waste across the country. It is also evident that a range of actions to minimise C&D waste may be required, rather than a 'one size fits all' approach. For example, actions should include practical, on-site considerations as well as behavioural or more policy-focused responses.

This will take a coordinated, multi-faceted approach within a wider framework of waste minimisation measures to specifically address opportunities to decrease current levels of C&D waste and increase rates of C&D waste diversion.



5.2 Implications for industry

The findings of this research have a number of potential implications for the building and construction industry. These include:

- Willingness to achieve meaningful levels of C&D waste minimisation. 50% of waste stakeholders considered that there is a general willingness from the building and construction industry to minimise volumes of C&D waste. This means that the remaining 50% of waste sector stakeholders did not think there is a willingness from industry to minimise C&D waste. The building and construction industry could consider its messaging and communications around C&D waste minimisation, to ensure that its willingness, ability, and success stories regarding C&D waste minimisation are understood. This may require leadership from an industry group or through partnerships with organisations such as WasteMINZ.
- Regulation may be coming, be prepared. Of the top three actions identified by waste management stakeholders to minimise current C&D waste levels, regulatory mechanisms accounted for 42% of responses. This included actions to legally requiring the building and construction industry to minimise C&D waste (25% of responses) and extending the landfill levy to apply to C&D fills and increasing the levy rate (17% of responses). It is therefore timely for the building and construction industry to consider the possibility and implications of greater regulations regarding C&D waste, in order to position itself to best respond. This could be through knowledge-sharing or behaviour change programmes, if required.
- Opportunities exist to create knowledge-sharing initiatives to meet industry needs. The building and construction industry is in a position to create (or co-create) knowledge-sharing initiatives to meet its particular needs. This may be in terms of content (for example, practical onsite guidance to understand the recycling potential of common C&D waste materials) or the method of learning (for example, on line or as part of existing builder training). It may also be



useful for industry to understand the business case for recycling and reuse of C&D waste as opposed of disposal to landfill. This will be particularly relevant if MFE's current proposals to change the landfill levy come into effect. Industry has an opportunity to show leadership and create C&D waste learning opportunities that best suit its needs.

- Partner with stakeholders across the building supply chain, design community, and waste management sector to create change. As briefly described in Section 2.2 of this report, a wide range of stakeholders are undertaking a variety of initiatives to reduce levels of general and C&D waste and increase diversion rates from landfill. The building and construction sector need not reinvent the wheel, but could look outside of traditional construction industry partnerships to explore the potential for partnering with organisations with similar waste management aspirations. This could include with local government, app developers, or private sector companies.
- Show proactive leadership to resolve C&D waste issues rather than reacting to regulation. Real opportunities exist for the building and construction industry to show leadership in C&D waste minimisation practices. This could include, for example, local chapters of industry organisations (such as Master Builders) understanding what C&D recycling and reuse facilities are available in its areas and informing members. If appropriate facilities are not available (for example, no concrete or rubble recycling) then industry could work with local stakeholders (councils or the private sector) to attract such facilities.

5.3 Further research

Through the course of this research, a number of areas of additional research that could contribute to C&D waste minimisation efforts became apparent. These potential research areas are listed below. The purpose of this list is to ensure that these ideas and opportunities are not lost. It does not predetermine that any such additional research may be undertaken.



- Wider survey of building companies (beyond Northland and Southland)
 to obtain a better understanding of attitudes to, and current practices
 regarding, C&D waste management. A larger sample size would provide
 a clearer picture of C&D waste minimisation opportunities nationwide
 and allow comparison between regions to understand differing contexts
 and challenges.
- 2. Stocktake of current initiatives specifically targeted at C&D waste minimisation. A selection of current initiatives is included in Section 2.2.2 of this report, however, this is a small sample of what may currently be in progress across the country. C&D waste minimisation initiatives could be identified, monitored, and outcomes shared to increase knowledge and enable successful initiatives to be replicated.
- 3. Further to the above point, monitor the uptake of voluntary initiatives such as Homestar (in relation to waste credits) and the NZ Ecolabelling Trust's specification 'EC-59-C&D Waste Services'. This could provide an indication of willingness to minimise C&D waste and provide useful behavioural information.
- 4. Stocktake of current local government by-laws regarding waste disposal, to understand local level regulation applicable to C&D waste. Case studies could explore the impacts of by-laws on C&D waste volumes, and provide this knowledge to local government and the building industry.
- 5. Wider C&D waste data collection exercise. 24% of waste stakeholders identified that they collected C&D waste data. Further to the data collection exercise described in Section 3.2.2.1, further data could be obtained and analysed to better understand C&D waste characteristics and inform any minimisation initiatives.
- 6. Case studies of major developers to understand current C&D waste practices and diversion or minimisation opportunities. This includes major government developers such as Kāinga Ora and the Ministry of Education, both of whom expressed an interest in C&D waste research.



- 7. In advance of MFE's data proposals to collect information regarding the location of landfills, cleanfills, and transfer stations, it may be useful to complete research regarding the specific C&D waste recycling facilities available in each region. This could include the costs of recycling to understand how facilities compare across the country and explore why recycling facilities may be available in one location but not another.
- 8. The impacts of earthquake strengthening regulations particularly on demolition waste, and how local government and/or the market may be responding to increased need for deconstruction waste facilities. This would position industry to respond to any future spikes in demolition.
- 9. A review of existing resource consents for cleanfills across the country, along with any data collected as a result of resource consent conditions. This would provide an additional information source, depending on the availability and reliability of such information.
- 10. Implications of reuse of C&D waste materials. This could assess whether insurance applied to reused materials given product specifications, building code regulations, and the 10 year builder warranty on newbuilds. This was raised by a survey respondent and findings could inform the building industry around the implications of reusing materials.
- 11. Case studies (international and national) regarding the provision of accessible waste recycling and reuse facilities in regional areas (outside of main centres). This could aid understanding of how to attract diversion facilities in regional New Zealand.

Through this research, relationships have been formed with a range of C&D waste stakeholders across the country. It would be beneficial to utilise this momentum to create change in how New Zealand, and not just the building and construction industry, manage C&D waste. This may include research on the topics listed above, or other topics as considered necessary by industry and stakeholders. Such research could meaningfully assist the 'generational handover' noted by one survey respondent, where "the people being left to clean up are slowly becoming the ones in leadership positions with the power to do something about it".





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Appendix 1: Pilot Study Infographics