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Medium-density housing: Can we build it?

Kate Bryson, Toni Kennerley and Anne Duncan

BRANZ
1222 Moonshine Rd, RD1, Porirua 5381
Private Bag 50 908, Porirua 5240
New Zealand
branz.nz

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Preface

This study is part of BRANZ's medium-density housing (MDH) programme, which aims to give industry the skills to deliver MDH that meets the needs of New Zealanders.

Acknowledgements

We would like to thank:

- all the participants from the building industry who were interviewed for this study – without your contributions, this research would not have been possible
- Chiara LaRotonda for conducting the numerous interviews for this research
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Abstract

New Zealand is facing significant housing pressure, and medium-density housing (MDH) is set to be an important part of the solution. This study investigated who in the building industry has the interest and ability to deliver MDH and what skills gaps exist that might impede this delivery. 105 building industry members were interviewed, and a thematic analysis was conducted on the interview transcripts. Themes that emerged around industry interest and ability to deliver MDH focused on financing, government support for delivery, community acceptance of MDH, building regulations and the drive for profit. Several specific industry sectors affected by skills gaps and shortages were identified, as well as more general themes around skills deficits. These themes focused on MDH skills shortages, MDH skills gaps, upskilling the building industry in MDH, MDH training, undervalued trades careers and the impact skills gaps and shortages have on building outcomes. The implications of these themes and possible solutions to the issues they raise are discussed.

Keywords

Medium-density housing, skills gaps, skills shortage, delivery, MDH, finance, Building Code compliance, building consent.

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Executive summary

Medium-density housing (MDH) is set to play an increasingly important role in relieving New Zealand's housing crisis. The KiwiBuild scheme aims to deliver 100,000 affordable homes to the market over the next 10 years – 90,000 of them will be MDH. This report asks who in the building industry has the interest and ability to deliver this MDH and what the skills gaps are that may prevent its delivery.

Participants within this study were adamant that the New Zealand building industry must begin to resolve the skills gaps and shortages that exist around MDH. Until then, it will be difficult to increase interest and ability to deliver MDH. The industry representatives who took part in this study called on the government to help address some of the barriers to delivery. Since then, the government has announced the KiwiBuild scheme, which goes some way to addressing issues around finance, risk and profit. However, while skills gaps and shortages in the building industry persist, the delivery of MDH cannot be assured. Specific skills shortages highlighted were around technical aspects of MDH and more generally in the areas of design, prefabrication, project management, building, consenting, developers and engineers. There was also a skills gap identified in understanding and working with the finances around designing and building MDH. The view of our participants was that career paths need to be clearer and more attractive in order to attract the required quality of new entrants to the industry. Finally, the regulatory systems (consenting and Resource Management Act) currently do not operate well and disincentivise interest in delivering MDH.

Our interviewees recommended that investment be made in upskilling the existing workforce in MDH. This should include skills around consenting and technical aspects of building MDH. Ongoing workforce training is one approach to this upskilling. Better coverage of MDH building practice during apprenticeship level training is also recommended to ensure new building professionals are entering the workforce equipped to deliver the variety of building typologies New Zealand needs. In addition, building consent authorities (BCAs) need to be better resourced to process resource and building consent applications for MDH faster and at less cost. Government investment in BCA upskilling is recommended as part of the KiwiBuild scheme. Finally, the systems and policies put in place as part of the KiwiBuild scheme need to be set up with a longer-term objective than simply providing 100,000 homes over 10 years. KiwiBuild should be treated by the New Zealand building industry as an opportunity to diversify its capabilities with a view to providing the good-quality MDH New Zealanders will need beyond 2028.

1. Introduction

Medium-density housing (MDH), defined as multi-unit dwellings up to 6 storeys (Bryson & Allen, 2017), will play an increasingly significant role in meeting New Zealand's housing needs (Tookey, 2017). Supply and demand analysis suggests that approximately 35% of new homes in New Zealand will be MDH by 2025 (Page, 2017). The recently announced KiwiBuild scheme aims to deliver 100,000 affordable homes over the next 10 years. This means an even greater proportion of New Zealand's new housing stock is likely to be MDH. The government expects around 90% of KiwiBuild homes to be multi-unit dwellings. This report asks who in the building industry has the interest and ability to deliver this MDH and what the skills gaps are that may prevent its delivery.

It is important to understand these factors so organisations within the building industry (land development and building companies) can deliver MDH without encountering roadblocks such as skills gaps or skills shortages. In this way, interventions can be developed (if required) to address such roadblocks and facilitate the efficient delivery of quality MDH to meet forecast demand in the medium and longer term.

Through its MDH research programme, BRANZ is well positioned to identify both who has the interest and ability to deliver MDH and what the skills gaps are that may impede its delivery. BRANZ undertook a large number of stakeholder interviews to obtain industry insights on these factors. Those findings are presented in this report.

It is anticipated that the report outcomes will enable the industry to more effectively position itself to respond to growing MDH demand.

2. Research method

2.1 Research questions

This research addresses two key questions:

- What is the level of interest and ability to deliver MDH in the industry currently?
- Do we have the skills to be able to build the MDH we need? If not, where are the gaps?

2.2 Research outcomes

The research has assessed the level of interest and ability within the building industry to meet the forecast demand for MDH over the next 10 years. The reason for doing this was to identify whether the level of interest and ability to deliver MDH falls below the expected level of demand. If it does, BRANZ can support the industry to develop a plan to encourage and support suppliers to meet anticipated demand for MDH.

The research has also identified what the current skills gaps are in relation to the delivery of MDH in New Zealand. The reason for doing this was to identify what, where and how skills development and support needs to take place. This knowledge can then inform the development of targeted training programmes so that industry can incentivise remediation of any identified skills gaps over the next 3–5 years.

By undertaking this research, it is intended BRANZ will have the required information to stimulate the industry to increase capacity and capability to provide MDH that meets the needs of New Zealanders.

2.3 Research structure

Originally, BRANZ intended to complete a separate research study for each of these two questions. However, the research has been combined into one report due to the high level of overlap between the topics particularly regarding capability. Skills gaps are a large component affecting the ability to deliver MDH. It is therefore expedient to combine the research to streamline data-gathering exercises (such as interviews with industry stakeholders) and present integrated findings.

2.4 Methodology

The research was approached using a qualitative methodology. It is based on a set of 103 telephone interviews with industry stakeholders. They were asked a set of questions regarding their views on the key research questions. The email invitation to participate and telephone interview script are attached in Appendices C and D.

A literature review was also undertaken. This enabled us to understand what has been published in areas relevant to the key research questions. This knowledge has been used to contextualise analysis of the interviews.

2.5 Ethics

This research has ethical approval from BRANZ's external human ethics advisor, in accordance with BRANZ's human ethics policy.

2.6 The BRANZ MDH research programme

In 2017, BRANZ embarked on an extensive research programme aimed at improving the quality and delivery of MDH in New Zealand. This research programme seeks to achieve the following:

- The building industry has the technical information necessary to enable the design of quality, affordable and desirable MDH.
- The building industry has the skills to design and build quality and affordable MDH.
- MDH buildings are maintained to sustain long-term performance.
- Everyone has a shared understanding of how to optimise the journey through the building and resource consent process for MDH.
- Increased community acceptance of MDH as a housing option.

This report forms part of the second research success criterion, aimed at ensuring that the building industry has the skills to design and build quality and affordable MDH. It complements the current suite of BRANZ reports published on this topic, as identified in the References section of this report.

2.7 Definitions

The following definitions are used in this report:

- Medium-density housing or MDH – multi-unit dwellings of up to 6 stories.
- Interest – the awareness and intent of an organisation to deliver MDH.
- Ability – the capacity and capability of an organisation to deliver MDH.
- Skills gaps – specific occupational competencies or capabilities that workers may not possess (for example, plumbing or engineering skills).
- Skills shortage – an insufficient number of workers with the required occupational competencies or capabilities (skills) to undertake specific tasks.

2.8 Disclaimer

This research presents the views of our interviewees. We have analysed the information they provided and present it in this report. All opinions presented are the opinions of research participants.

3. Literature review

A literature review was completed to obtain an understanding of what information currently exists in relation to interest and ability within the building industry to deliver MDH and MDH industry skills gaps. This establishes a baseline of existing knowledge. From this baseline, key themes from the literature are summarised. This has informed the analysis of the interviews conducted as part of this research.

This review builds on the extensive literature review undertaken by Bryson & Allen (2017). This current review does not repeat previous findings but delves into greater detail regarding interest and ability within the building industry to deliver MDH in New Zealand and MDH industry skills gaps.

Note that this review is also limited to literature produced in relation to the New Zealand MDH development context.

3.1 Interest and ability to deliver MDH

This section summarises what literature is available regarding the interest (awareness and intent) and ability (capacity and capability) of organisations within the building industry to deliver MDH. It then identifies and discusses the key themes that emerged from this literature.

3.1.1 Information available

Very little literature could be found regarding the level of interest organisations within the building industry may have to deliver MDH. Financiers such as Westpac provide industry insights and may predict trends about MDH delivery (Clark, 2017). However, interest to deliver MDH is generally not a question asked of organisations and consequently is not a topic that is well documented.

Similarly, a relatively small amount of literature is available regarding the ability of organisations within the building industry to deliver MDH. BRANZ completed some work in this regard through the identification of ‘experts’ in the delivery of MDH (Page, Kennerley & Brunsdon, 2018). However, the majority of literature reviewed tended to focus on skills gaps and shortages as opposed to overall capacity and capability of organisations to deliver MDH. In addition, the literature reviewed tended not to identify those organisations that do have the ability to deliver MDH. It focused on capacity and capability issues that mean organisations may not have the ability to deliver MDH.

A more effective way of understanding the level of interest and ability building industry organisations may have to deliver MDH is through qualitative research methods such as surveys or semi-structured interviews. This is preferable to attempting to draw meaningful conclusions from the currently small amount of literature available. Interviews have therefore been undertaken on this topic and contribute to the findings of this report.

3.1.2 Themes from literature

Only a limited amount of literature could be found regarding the interest and ability of organisations within the building industry to deliver MDH in New Zealand. However, the following themes were identified from that which was available. These findings have informed the analysis of the interviews conducted as part of this research.

Company size

Larger organisations are considered more likely to have the interest and ability to deliver MDH than smaller, less well resourced firms. Clark (2017) predicted that large firms will increasingly turn their focus towards delivering medium and high-density residential buildings, particularly terraced housing and low-level apartment blocks. The reason for this was attributed to currently high profit margins, although it was noted that these margins may narrow as the supply of MDH increases (Clark, 2017).

Page et al. (2018) similarly found that experts in the delivery of MDH in New Zealand were predominantly larger organisations. These included retirement village operators, social housing providers and some developers and group builders who had completed multiple MDH projects. These organisations were found to have the experience, delivery processes, market knowledge, understanding of the regulatory environment, relationships across the industry and, inevitably, access to the capital necessary to deliver MDH projects. Smaller organisations were found to struggle with some or all of these factors and therefore may be less likely to possess the interest and ability to deliver MDH. It has been noted, however, that a lack of ability by organisations such as are seen in the delivery of MDH can reduce overall growth (Lobo & Wilkinson, 2007). This suggests it may be worth investing in smaller organisations to encourage growth within the industry.

The question remains whether the New Zealand building industry would be better to focus resources on increasing the interest and ability of larger organisations to deliver MDH. Would this effort be better directed to scaling up smaller organisations? Should there be a combination of both?

Nature of the building industry

The seasonality of the industry skill base is repeatedly noted as a key issue impacting on ability to deliver MDH within the industry. The industry is tied to the current economic climate and, as such, the level of skilled personnel continues to fluctuate with economic changes (Tran & Tookey, 2011). Clark (2017) noted that it is common practice within the building industry for firms to contract skills for extended periods rather than directly employing staff and putting them on the payroll. The Ministry of Business, Innovation and Employment (MBIE, 2013) also identified that the cyclical nature of the sector may discourage firms from taking on permanent employees and investing in their development.

The tendency to subcontract to specialists rather than train existing employees means that the industry lacks a workforce of people who are skilled in multiple areas (La Masurier & Hodkinson, 2006). This ability and willingness to subcontract makes it difficult to gauge the level of interest and ability of organisations to deliver MDH. For example, organisations may have the interest and ability to deliver MDH if their usual subcontractors are available. However, they may not have the interest and ability if relied-upon contract staff are not in place. Similarly, skills gaps occur if there is little appetite to provide training for contract staff given the temporary nature of their employment versus the cost of training.

The nature of the building industry is such that any quantifiable analysis of the size and skill level (qualifications) of organisations to determine their ability to deliver MDH would be redundant. This is because the structure of such organisations is fluid and often dependent on the input of contract skills as well as the market conditions at the time.

Market conditions

Literature indicated that interest and ability to deliver MDH is related to what is going on in the market. At any particular point in time, a number of organisations may be interested in delivering MDH if certain conditions are in place, for example:

- if there is demonstrated demand for MDH
- if MDH is profitable compared to other construction opportunities
- the building industry is at the right stage of the boom/bust cycle at the relevant time (Clark, 2017).

If these conditions are not in place or if other externalities divert construction efforts (such as an earthquake or other natural disaster), there may be a low level of interest to deliver MDH in New Zealand.

One key issue influencing the demand for MDH, and thus interest in delivering MDH by the industry, is the concern of the general public about MDH. In general, the public cite concern about construction quality of MDH. Concerns with issues such as privacy, overcrowding and access to public amenities are also reasons given for the lack of demand or willingness to invest in and occupy MDH (Ancell & Thompson-Fawcett, 2008). MDH is a relatively new trend within New Zealand, and more effort is needed by the industry and government to make MDH an attractive housing option for the general public.

A further delay to the delivery of MDH relates to the consenting process, which is often slow and costly. This not only adds to the cost of producing MDH but may discourage developers from investing in MDH altogether (Dunbar & McDermott, 2017). These delays and the stability of work within the stand-alone housing industry impact the level of interest and willingness to supply MDH.

In order to maximise MDH delivery, the optimal market conditions could be identified and a process developed to institute and stabilise these conditions as much as possible. Additional research into the opportunities and constraints associated with financing MDH development projects would also be useful. This theme is discussed further in the analysis section of this report.

3.2 MDH industry skills gaps

This section summarises what literature is currently available regarding skills gaps in MDH delivery in New Zealand. It then identifies and discusses the key themes that emerged from this literature.

3.2.1 Information available

A moderate amount of literature is available regarding current skills gaps within the building industry in its entirety (for example, low to high-density housing and/or commercial construction). Less, if any, literature is available regarding skills gaps in delivering MDH specifically so much of the literature reviewed here relates to the shortages and gaps across the industry as a whole. However, many of these experiences are applicable to the case of MDH and have thus been included in this discussion.

The lack of dedicated literature examining MDH in New Zealand may be because industry skills gaps are not typically analysed per building typology but rather by occupation (carpenters, plumbers and so on) and by region (Auckland, Christchurch

and so on). It would be useful, if possible, for industry labour and skills projections to include breakdowns per building typology. This would enable a better understanding of the nature of skills gaps and thereby more targeted training and policy responses.

The information that is available regarding skills gaps within the building industry ranges from central government projections to local government analysis of the housing market. For example, MBIE publishes annual Future Demand for Construction Workers and National Construction Pipeline reports (MBIE, 2017b). Wellington City Council and Auckland Council released Housing Taskforce reports in 2017 that identified skills gaps as a key constraint to housing delivery.

Other organisations providing commentary and analysis of skills gaps in the building industry include:

- research institutes such as BRANZ
- industry organisations such as the New Zealand Construction Industry Council (NZCIC) and Auckland Construction Skills Alliance
- training providers such as the Building and Construction Industry Training Organisation (BCITO).

In addition, the issue of skills gaps in the building industry has recently been well covered in the New Zealand media. Articles specifically referenced the need for more apprentices and identified areas with perceived skills shortages (for example, project managers and plumbers). There was also a large amount of coverage following the government's announcement regarding KiwiBuild and the impact this may have on the supply side of the housing market (Gibson, 2017).

Overall, the majority of literature reviewed for this section is recent in nature, having been published between 2016 and 2017. This means that it provides current insights and can be relied upon in terms of relevance and timeliness. The nature of literature available is also wide-ranging, including (but not limited to):

- quantitative projections of labour and skills demand from central government (MBIE, 2017a)
- regional responses to housing issues (Auckland Council, 2017; Wellington City Council, 2017)
- industry insights from research, industry and training organisations such as BRANZ (Page, 2017), NZCIC (Taylor, 2016) and BCITO (2016)
- predominantly issues-based media commentary and analysis – for example, regarding apprenticeships or KiwiBuild.

One gap apparent in the literature is a lack of qualitative insights from specific occupations within the building industry should these differ from those of industry organisations. An example is what architects, builders or BCAs believe the skills gaps to be based on their specific experiences in MDH delivery. This gap is addressed through the research undertaken as part of this study.

The information contained in this literature review provides a sound basis from which to draw key themes regarding skills gaps in the delivery of MDH, as identified in the following subsection.

3.2.2 Themes from literature

Skills gaps and shortages exist

It is not always immediately clear whether New Zealand lacks enough people to deliver the required housing or if the existing people simply lack the skills to do so (Clark, 2017). Notwithstanding, there is broad consensus in the literature available that skills gaps and shortages[1] do exist in the overall delivery of housing in New Zealand. There is very little literature available, however, regarding skills gaps and shortages for MDH delivery specifically.

Skills gaps and shortages in housing delivery are recognised as issues across all levels of the building industry. The Wellington City Council Housing Taskforce report (2017) identifies labour and skills shortages as supply constraints for new housing. The Auckland Council Housing Taskforce report (2017) identifies difficulties training, recruiting and retaining skilled staff as a challenge facing the construction industry. Skills gaps are also recognised as an issue within the industry. A construction survey undertaken in 2017 found that a lack of skilled workers was the top challenge to recruiting staff (Teletrac Navman, 2017).

In terms of quantifying this skills shortage, BCITO reported that the building industry needs 60,000–65,000 additional workers by 2022. Of these, 28,000–30,000 need to be trade-qualified workers with a level 4 or better qualification (i.e. the additional workers need to be skilled). In meeting this demand, BCITO anticipates that approximately 12,500–13,000 apprenticeships will be completed by 2022 (Bohling, 2017). Notwithstanding the impact of targeted immigration, this leaves an estimated skills shortage of 15,000–17,000 trade-qualified workers with a level 4 or better qualification by 2022.

This estimated skills shortage to 2022 relates to the building industry in its entirety and not to MDH specifically. However, it is reasonable to conclude that a comparable or even greater skills shortage exists in relation to MDH delivery. Approximately 35% of new homes in New Zealand are anticipated to be MDH by 2025 (Page, 2017).

The presence of skills gaps and shortages is not a new feature, having plagued the New Zealand building industry for several decades. The cyclical nature of the industry often results in skills shortages during periods of demand and a surplus of workers during periods of decline (Tran & Tookey 2011). There is a tendency for the industry to offer reactive training, where a large number of apprentices are trained to meet demand in a boom economy. However, by the time training is complete, the economy is often in decline (La Masurier & Hodkinson, 2006). Similarly, there is little incentive to train apprentices when the economy is in recession, particularly for small companies who have limited financial resources. This results in skills shortages when the demand increases. To encourage the development of a stable and skilled workforce, Lobo and Wilkinson (2007) suggested that the government needed to offer more incentives, particularly to those providing support and training for apprentices.

There are a number of factors that influence the skills gaps and shortages within the industry. Across the literature, recruitment (of new workers) is identified as a key issue impacting the skills shortages faced by the industry. Poor job security, concerns about

[1] In the literature, the term ‘skills gap’ is often used interchangeably to describe both a lack of skill in the existing workforce (skills gap) and a shortage of workers (skills shortage). For the sake of clarity, this report uses the appropriate terms when discussing the literature, even if the generic term ‘skills gap’ was used by the original authors.

occupational health and safety and low pay are identified as reasons individuals may choose alternative careers. Public perception of the industry (as being ineffective, and an 'unintelligent' profession) and the prioritisation of university degrees over trade qualifications also hinders recruitment (La Masurier & Hodkinson 2006). These issues particularly impact on the recruitment of young people. Addressing this stigma and promoting careers in the trades (especially through schools' careers advisors and parental input) may help address current and projected deficits.

Immigration is repeatedly cited across the literature as a potential avenue for attracting skilled employers to the New Zealand industry. Targeted immigration has been used in the past to address skills shortages and provides a larger pool of workers to fill current gaps within the New Zealand building industry (Lobo & Wilkinson, 2007). There are challenges to this approach to recruitment. In particular, wage discrepancies across the globe have made it difficult for the industry to entice skilled workers from overseas to the industry. This has concurrently led to an exodus of New Zealand workers to countries such as Australia where they can earn a higher income (Dunbar & McDermott, 2017).

Further research regarding skills gaps and shortages in MDH-related construction occupations and qualifications would be useful to provide more clarity on specific skills deficits for each occupation. This may assist in the development of training programmes or immigration policies to increase the number of appropriately skilled workers able to deliver MDH.

Specific skills gaps and shortages

The literature reviewed generally refers to skills gaps and skills shortages interchangeably. Within the building industry, the main resource constraint was considered to be sufficient skilled labour for all building work – including MDH. Carpenters were identified as the main shortage, along with site management and council inspection services (Page, 2017).

MBIE provides occupation-based projections in its annual Future Demand for Construction Workers reports. This demand for occupations can be viewed as a potential future skills gap and skills shortage to which the building industry can respond through targeted training and incentivising specific occupations. The 2017 MBIE Future Demand for Construction Workers report identified occupations expected to experience the largest growth to 2022 across New Zealand. These include plumbers (with an expected increase of 15%), electricians (increase of 14%) and civil engineering professionals (increase of 12%) (MBIE, 2017a).

This forecast level of demand for construction workers also differs throughout the country. MBIE (2017a) states that Auckland will require 190,000 total construction-related employees by 2022 and Waikato and Bay of Plenty will require 11,000. Wellington will require 4,200 in the same timeframe. Canterbury's requirements are expected to stay steady until 2021, after which time demand is anticipated to decrease by 1,200 (MBIE, 2017a).

Project builders (builders/carpenters, as per the ANZSCO classification system) are the occupation consistently expected to experience levels of growth across Auckland, Waikato, Bay of Plenty and Wellington. They are followed by plumbers in Auckland, Waikato and Bay of Plenty. By contrast, in Canterbury, the demand for project builders is expected to decrease by 15% from 2021 (MBIE, 2017a). The mobility of the Canterbury workforce could be investigated to determine whether project builders

would be likely (or could be incentivised) to migrate north to fulfil demand in other regions once demand in Canterbury has declined.

Overall, there appeared to be a divergence in the literature reviewed regarding those occupations within which skills gaps occur. It would be useful to quantify the number of existing qualified workers per occupation against MBIE's estimated worker projections. This would gauge the scale of the skills shortage in overall housing and then (if possible) MDH delivery.

MDH-specific skills gaps

As identified above, the majority of literature regarding skills gaps and shortages in the building industry relates to the industry as a whole and not to MDH delivery specifically. Notwithstanding, some literature did highlight skills or technical competencies relevant to MDH.

Taylor (2016) observed that councils are seeing more building inspection failures with MDH because of the inexperience of builders when installing inter-tenancy walls, acoustic sealant and fixing patterns for fire ratings. Auckland Council's Housing Taskforce report (2017) also identified special issues in building MDH that are not currently well addressed in the Building Code and are important to resolve. An example is managing noise through common walls.

This lack of information regarding MDH-specific skills gaps indicates that more research on this topic would be beneficial. This would enable the building industry to pinpoint MDH-related construction issues and develop targeted MDH training to address them, thereby ensuring the construction of quality MDH in the future.

3.3 Summary

Overall, there was a general lack of literature regarding the interest and ability of organisations within the building industry to deliver MDH and what the skills gaps and shortages are that may impede MDH delivery.

This is due predominantly to the fact that construction and labour forecasts do not categorise projections by building typology but rather by occupation and geographic region. Therefore, insights regarding MDH as a specific building typology are difficult to extract from the wider analysis for the entire building industry.

Notwithstanding the lack of relevant literature, the following key points were raised and have informed the analysis of interviews conducted as part of this research.

3.3.1 Interest and ability to deliver MDH

Current literature does not clearly identify who in the building industry has the interest and ability to deliver MDH. Nonetheless, larger organisations were considered more likely to have the interest and ability to deliver MDH than smaller, less well resourced firms. This is due to the experience, market knowledge and access to capital usually afforded to larger organisations (Page et al., 2018).

It would be beneficial to investigate whether the New Zealand building industry would be better to focus resources on increasing the interest and ability of larger organisations to deliver MDH or this effort would be better directed to scaling up smaller organisations or a combination of both.

Interest and ability to deliver MDH may also change over time. At a particular point in time, a number of organisations may be interested in delivering MDH if certain market conditions are in place (such as demand, labour availability and financing).

Additional research into the opportunities and constraints associated with financing MDH projects would be useful to make MDH more attractive as a development option and thereby increase interest in MDH delivery.

The cyclical nature of the sector may discourage firms from taking on permanent employees and investing in their development (MBIE, 2013), thereby impacting the ability of organisations to deliver MDH.

3.3.2 Industry skills gaps and shortages

Skills gaps and shortages in housing delivery are recognised as an issue across all levels of the building industry. However, there is very little information available on skills gaps or shortages specifically related to MDH delivery. This absence of MDH-specific data could be addressed by reframing labour and construction projections to include breakdowns per building typology (including MDH).

A skills shortage of an estimated 15,000–17,000 trade-qualified workers with a level 4 or better qualification by 2022 is anticipated (Bohling, 2017). Although no literature specifically addresses the MDH skills shortage, this may be even higher given the growth of MDH to an anticipated 35% of new homes by 2025 (Page, 2017).

The 2017 MBIE Future Demand for Construction Workers report identified occupations expected to experience the largest growth to 2022 across New Zealand. These included plumbers (with an expected increase of 15%), electricians (increase of 14%) and civil engineering professionals (increase of 12%) (MBIE, 2017a).

Further research regarding skills gaps and shortages in MDH-related construction occupations and qualifications would be useful to provide more clarity on specific skills gaps and shortages for each occupation. This may assist in the development of training programmes or immigration policies to increase the number of appropriately skilled workers able to deliver MDH.

4. Interviews

4.1 Rationale for research methodology

A qualitative approach was adopted for this research. Qualitative interviewing techniques and thematic analysis allow for more in-depth investigation and understanding of the issues being researched. This method provides rich data that explains the complex and nuanced factors that contribute to the skills gaps and interest and ability to deliver MDH. The interactions and interlinkages of the issues involved can be better identified, and a more holistic understanding of the research area can be gained.

4.2 Recruitment

Members of the building industry with an interest or experience in MDH were recruited to participate in a telephone interview. Advertisements were placed in building publications, industry organisation newsletters and websites, and an email invitation (attached in Appendix C) was sent to 17,492 licensed building practitioners listed on BRANZ's database.

122 building industry participants expressed an interest in being interviewed. They were provided with an information letter via email prior to the interview taking place (attached in Appendix C), which explained confidentiality and what the interview entailed.

Participants were recruited up to 'saturation' of the data. This means that the researcher stopped recruiting new interviewees when interviews stopped revealing new information. This saturation point was met after approximately 80–85 interviews. It is good practice to continue data collection somewhat beyond the saturation point to ensure all the research themes have been exhausted. In addition, there was good interest in this study, so data collection was continued. Therefore, 105 interviews were completed. This is a considerable sample size for a study of this nature and ensured a robust interrogation of the research questions.

Informed consent was gained verbally at the start of each interview and was recorded. Interviewees were asked a set of questions (telephone script attached in Appendix D) relating to the research aims.

Participants were offered a $50 voucher from the trade store of their choice to thank them for their time.

4.3 Interview procedure

Participants were called by the interviewer at the arranged interview time. Interviews were recorded using an app installed on the phone used for the interviews. Immediately after each interview, the audio file was downloaded from the phone onto a computer where it was saved securely, as per the ethical requirements of the study. Interviews took between 20 and 60 minutes, with the average interview lasting 30 minutes. Interviews were semi-structured. Participants were asked questions about:

- their personal work experience with MDH
- good and bad examples of MDH
- the organisations best positioned to deliver MDH in New Zealand

- industry enablers and barriers for delivery of MDH
- industry skills shortages and skills gaps around MDH delivery
- training issues for MDH delivery
- how the industry could be ideally set up to deliver quality MDH in New Zealand.

4.4 Analysis of interviews

Interview recordings were transcribed verbatim and transcripts were loaded into NVivo software for the purposes of coding. A thematic analysis was conducted. Thematic analysis was selected as the most appropriate method of analysis due to its flexibility. It can be applied to almost any qualitative data set and does not rely on a specific theoretical approach. A thematic analysis is a method of qualitative analysis where data (in this case, transcripts of recorded interviews) is coded and sorted into themes. A theme reflects a pattern in the data – something important to the research question being asked. In this study, the themes in the data were identified by the researcher reading each of the transcripts and noting the patterns in responses. The themes identified in the data formed a coding scheme. The entire data set was then coded according to the coding scheme, meaning that every example of that theme was identified and collated using NVivo software. Another researcher then checked all the coded transcripts to sense check the coding. Any disagreements over how an excerpt was coded were discussed by the researchers until agreement was reached as to the appropriate code. A summary of all the themes identified in the analysis are reported in Appendices A and B, including subthemes that emerged during analysis.

The most commonly mentioned themes were fully analysed and presented in this report. All themes are described in the attached Appendix A.

5. Interview respondents

As this study report is describing a qualitative thematic analysis, it is advantageous to present the results and discussion sections together. This allows for themes to be presented with excerpts from the transcripts alongside the analysis of their implications and meanings for the building industry.

The results of the thematic analysis are reported in three sections. The first describes the sample. The second covers the themes that emerged in the area of who has the interest and ability to deliver MDH. The third reports on themes around skills gaps and shortages for MDH delivery. There is considerable overlap between these two research areas, and these are discussed together at the conclusion of this report.

At the beginning of each interview, participants were asked a series of demographic questions about themselves and their role in the building industry with regards to MDH. Two participants declined to answer the demographic questions, so the results presented here are for the remaining 103 interviewees.

The median age of participants was 49 years. 20 said they were female and 83 were male. Table 1 presents the geographical spread of participants. Auckland was the most well represented region, which is unsurprising given the concentration of the building industry in that city and the prevalence of MDH there.

Table 1. Geographical spread of participants.

Region	Participants
Northland	2
Auckland	46
Waikato	7
Bay of Plenty	2
Hawke's Bay	2
Manawatu	1
Wellington	20
Nelson	4
Canterbury	8
Otago	2
N/R	9

Table 2 shows building industry areas in which participants had MDH experience or interest. Two participants said they had experience in both design and building/construction or research/academia. They are included in the design sector.

Table 2. Building industry sector in which participants have MDH experience or interest.

Building industry sector	Participants
Design	38
Building/construction	48
BCA/government	8
Research/academia	5
Other	4

Ethnic groupings were heavily in the New Zealand/Pākehā category (Table 3).

Table 3. Ethnicity

Ethnic group	Participants
New Zealand/Pākehā	74
Māori	6
Samoan	0
Middle Eastern	1
European	5
Asian	2
Americas	2
Australian	1
Cook Islander	1
Unknown	11

6. Analysis: Who has interest and ability to deliver MDH?

18 major themes relating to who has the interest and ability to deliver MDH emerged from the data set during the thematic analysis. Each of these major themes is described in Appendix A, where the theme is named, a description is provided and the subthemes are set out. For the purposes of this study, a subtheme is a pattern of responses that emerged within a major theme – a more granular discussion point commonly raised in the context of the major theme. Some of these subthemes are relevant to multiple major themes, and this demonstrates the interlinkages between the issues affecting the delivery of MDH.

In Appendix A, you can also see how many participants spoke about each major theme and how many times the major theme was mentioned by all participants across the entire data set. This measurement was used to identify the five most dominant themes that emerged from the data set. These are discussed in greater detail in this section. Each theme is introduced and excerpts from interviews are provided to demonstrate how the themes and subthemes were talked about by participants.

Table 4. Major themes identified.

Theme	Mentions
Finance fundamental to delivery	222
Regulations as barrier to delivery	173
Community acceptance of MDH required for delivery	163
The drive for profit means MDH is a less-attractive option for investment	157
Government to support delivery of MDH	145
Must deliver quality MDH	139
MDH specific skills and knowledge required	133
Company size matters – bigger is better	117
MDH is challenging to deliver	113
Skilled professionals required to deliver MDH	105
Affordable MDH must be delivered	103
Public and private parties to contribute to delivery	93
Experience of MDH important	82
International learnings to help delivery	80
Skills gaps/shortages barrier to delivery	72
Prefabrication and innovation required to deliver MDH	61
Hobsonville Point as an example of good delivery of MDH	21
New Zealand industry must deliver MDH	20
Total	**1,999**

Overall, there were five dominant themes, which are discussed in detail below:

- Finance is fundamental to ability to deliver MDH.
- Government needs to support delivery of MDH.
- Community acceptance of MDH is required if more MDH is to be built.
- Regulations (specifically building consenting) is a barrier to delivery of MDH.
- The drive for profit means MDH is a less-attractive option for investment.

6.1 Finance is fundamental to delivery

The theme that emerged most strongly across the data was that finance is fundamental to the ability to deliver MDH. This theme was discussed by 78 participants and mentioned 222 times by them. Participants said that the systems around gaining finance were a barrier to building MDH. They suggested that changes to New Zealand's financial systems could increase the number of private enterprises with the ability to build MDH.

> Get the financial system sorted out. They're all working against us at the moment. Almost every institution ... is working against it, and the 20% deposits is working against it. (Participant 5)

> Well, finance I guess is one of the big things. And people – I mean there's plenty of people that want to do this, but there's a disconnect there with the way the system works now, and also it's all profit driven, so unless there is some conduit between those two, it's not going to happen. (Participant 28)

Participant 28 makes the point that there are people in the building industry who have an interest in building MDH but that financial barriers mean those people do not have the ability to deliver it.

Security of contract and the ability to deliver volume was another issue raised by participants when discussing financial barriers to MDH. Some participants described how financial insecurity in the building industry was preventing investment in innovation.

> Security of contract. So there's ... a number of people who are wanting to invest in prefabrication or pods or modularisation of some description, and obviously that's a ... main advantage of going medium-density is that you can do it by volume ... and scale of economy to drive your cost down. But they're holding back because they don't quite know that, if they invest in a massive factory, ... they need to know that they've got a 5-year pipeline of work or a 10-year pipeline of work ... That's the problem in that they're – when you see it from a couple of prefabrication providers go belly-up, that makes everybody nervous and probably is a major deterrent thing for ... more entrance into the market or for people not building capacity. (Participant 4)

Participants spoke about the need to access significant financial backing to deliver MDH developments. Often financial capability was associated with company size, where it was perceived that larger companies were the only ones with the ability to deliver MDH.

> I suppose you'd go to someone like Fletchers who have the financial backing just to get in there and slam out the units. (Participant 1)

> Well I would think that the best people are probably the large-scale developers like the likes of Fletchers that have the resources ... to acquire the land, put in the infrastructure and do the building work. (Participant 47)

Fletchers was the most commonly provided example of a large private company with the financial capacity to deliver MDH. Central and local government were also frequently suggested as agencies with the financial ability to deliver MDH.

> Financial. Financial ability to be honest with you. I think that's a big problem across the board and being able to lend. Even as myself if I wanted to do it, I'd have to borrow money to do it … it's accessing funds, and those bigger developers and central and local government have the money available to do this sort of stuff. (Participant 27)

Government was not just seen as an agency that should build MDH itself, it was seen as having a responsibility to help the private sector attain finance to enable them to deliver MDH. It should be noted that these interviews were undertaken before KiwiBuild was announced, so participants were not aware that such a government initiative was forthcoming.

> On the financial side I think funding these developments, I don't know how you do that now without the government getting involved in some way and making … funding available on reasonable terms to groups, companies or any party who's got a good project that they want to put out there. Unless someone like the government gets behind that and guarantees it, I don't know how it's going to get off the ground. Because all the developers I know say it doesn't stack up, they just can't – the risk and reward's out of balance. They risk $5 million on something to make $200,000, well they're obviously not going to do it. (Participant 48)

> I guess it might just be still back to that, you know, we tend to think about either government funded or private funded, but there are permutations between those that could be looked at … not just government but council as well … It doesn't need to be like everything's just market and/or … everything's social housing, it can be a mix of things or … a range of options between council, government and private developers that could maybe make the whole thing work. (Participant 50)

In summary, when participants spoke about finance being fundamental to the delivery of MDH, they often said that the financial systems currently in place were a barrier for many in the industry getting involved. MDH developments were described as being the domain of large companies like Fletchers and central and local government. Participants suggested that it was the government's role to address the financial barriers to MDH delivery, which would increase the number of private organisations able to take on MDH projects.

6.2 Government to support delivery of MDH

The government was not just seen as being responsible for resolving financial barriers to MDH delivery. They were also identified as being best positioned to support private industry to deliver MDH across the building pipeline. Partnerships between government and the private sector were a strong subtheme around government delivery of MDH. 61 participants spoke about this theme, and they mentioned it 139 times. Again, it should be noted that these interviews were conducted prior to the announcement of KiwiBuild.

> It has to be socially led. It has to be led by … probably central government, in my opinion. It has to be led and driven by central government. Individual development companies are going to always steer to the cash, that's what they're there for, and so it leaves the management of regulatory bodies to direct that development. (Participant 25)

> I think it's a combined effort of government legislation mixed with any main contractor that has the ability to kind of put these buildings up in a quality manner. So I think it's everybody's responsibility to work together, but I think it does start from the government down. (Participant 85)

> I guess a lot of it comes from you need to have government backing for it. Like business and the industry on its own can only get so far … with regards to tackling social and affordable housing. I think the government needs to be a lot more involved – kind of get back to building … good-quality housing and state housing, but good state housing, like they did in the past. (Participant 14)

Hobsonville Point was provided as a successful example of central government, local government and industry partnerships. It was often described as a template for working together that should be replicated again in the future.

> I suppose because we've been involved in Hobsonville … it's a combination of central government and council and the private sector developers working together, and it has been quite a success so I think the more they can use that … like working together. Whereas in the past, a lot of the time working with council has been – they're seen as the police or you have conflict with council – but in Hobsonville, we had central government, council and the private sector all wanting to work together to produce a good product, and that's more examples we can see like that. I know I read in the paper the other day the new Minister of Housing mentioned Hobsonville as an example of what they want, they want to put a few more Hobsonvilles around the place … the councils working together a lot closer with central government and the private sector to come up with innovative approaches to … some of these housing developments. (Participant 44)

Participants had mixed opinions about whether the government should be developing and building MDH themselves. Most said Housing New Zealand was best suited to delivering MDH, while others thought they were not the appropriate agency.

> But Housing New Zealand ought to have sufficiently talented people in there to get their heads around medium-density housing and how they're gonna provide it. (Participant 5)

> I think organisations like Housing New Zealand should be more at the forefront. (Participant 65)

> I would love to say Housing New Zealand … and everybody should be confident saying Housing New Zealand, but unfortunately, I don't believe that they have the systems in place to be able to provide it. (Participant 18)

Some participants suggested that successful delivery of MDH will require a dedicated government agency.

> It probably needs a government body dedicated to getting medium-density housing off the ground and coming up with how do we sort out the planning issues, how do we sort out the design issues, how do you sort out the building side of it? (Participant 5)

The government was also seen to have a role in making land available for MDH development. Participant 89 described how government could provide land for

development and then form partnerships to support developers throughout the building process.

> I suppose one of the things is good-quality land available within city limits that can then be built on with medium-density units, so it could be the Crown or it could be the local council but then is not land banking that land any longer but releasing it for medium-density housing and then assisting that developer – because they're now a trust – then assisting with all those set-up costs, the consent, the subdivision, the development of all the essential services, all of that sort of thing … everybody coming to the party with medium-density housing, realising that it will in the end benefit them because they will end up with more ratepayers within the city bounds. (Participant 89)

Participant 84 discussed how MDH can be provided on existing Housing New Zealand sites and the need for appropriately sized land parcels for MDH to be available to build on. They also raised the issue of community acceptance of MDH typologies, which was itself a major theme of this study.

> I think it has to be government driven because councils traditionally stuff all this sort of stuff up, lose money. But really I guess it should be a council thing because … you need a dollop of land to put it on, not just a single section here and a single section there, you need 20 sections to really develop. I mean what the Housing Corp are doing in the Hutt, they've bowled a whole lot of units that were probably on quarter-acre sections. They have the opportunity there to rebuild them in a manner that gets more people on those sites – the apartment type stuff. But having said that, they've also pulled out apartments in Petone because people didn't want to live in them, they didn't like them. (Participant 84)

Partnerships between government and the private sector will be important if we are to deliver MDH, according to participants in this study. Participants did not tend to suggest that the government should be delivering MDH independently of the private sector. Rather, they felt that government should facilitate development by making land available and supporting industry through the development process.

6.3 Acceptance of MDH required for delivery

Another major theme that emerged from the data was that New Zealand communities will need to accept MDH if it is to be delivered successfully. It was talked about by 66 participants and mentioned 173 times. Some participants talked about consumer demand (home buyers and renters actively seeking MDH). Others spoke about community acceptance (people who live in and around MDH accept it), and some discussed housing preferences (the housing typologies people want or aspire to live in). All of these concepts were presented as being important to the delivery of MDH.

When housing preferences were discussed, there was broad agreement that New Zealanders traditionally prefer stand-alone living and that a change in thinking is required to increase the demand for MDH. Participant 30 described this as the need for a "cultural shift".

> I suppose another roadblock is … the old Kiwi … quarter acre have your own house on an allotment dream, so I think there's a bit of a cultural shift for basically New Zealanders in a general sense to say, hey, apartment living is actually OK and … it's a good entry point for a lot of people to housing, it's an

> affordable means of housing ... there's a big cultural shift, I think ... we could do a lot more of it. So I think that's another barrier, just actually trying to sell it to people that wouldn't have thought of it as a genuine, I don't know, option for them. (Participant 30)

Participant 7 explained that they thought there needed to be more consumer demand to incentivise MDH development. They also alluded to consumers needing to understand what MDH has to offer them – more compact living at an affordable price compared to stand-alone houses.

> I think the consumer demand has to be there and I think by consumers asking for this particular product. So in other words, I want a house that is slightly smaller than normal and I want that house to be at least a good couple hundred K less than ... what you would actually have for a stand-alone property. So there is a little bit of that consumer demand that needs to be increased but ... if the land hasn't been cut then it's never going to happen. (Participant 7)

Community acceptance of MDH was seen as fundamental to its success. Participants said that if MDH typologies are not accepted by the neighbourhoods around them and they are not an attractive option to communities, they will become "undesirable" places to live. This fear of undesirable development may be disincentivising the industry away from building MDH.

> I also think that the success of medium-density housing will rely on the communities that are built around them. We've seen time and again with housing projects, blocks of flats, dense housing in cities around the world, you have to be careful that ... people do not disregard them and ... they become undesirable for any number of reasons and then ... aren't used. It'd be pointless to have ... these places empty. (Participant 8)

Participant 32 described the issues that are seen to arise around amenity and infrastructure for infill development of MDH. These issues are likely to erode community acceptance and in turn reduce industry interest in delivering MDH in existing communities.

> But when there's existing dwellings going up, these large dwellings where they're knocking down old individual houses and putting these high-density or medium-density dwellings up in the middle of a suburb, then there's a lot of things to consider for the long term. We're talking about 50–60 years of these dwellings being there. So that's really important then to relook at that as well and consider the impact it has. Either there's going to be more and more coming, because these areas are often then zoned to take medium-density dwellings ... so there'll be more and more popping up as these older houses are knocked down so, and it's going to have a dramatic change on the schools, on the infrastructure, on the shopping, on the play areas, the green areas, the recreational areas that haven't been there because everyone has a backyard, so the kids ran around the backyard. But if you're now doing infill with these medium-density dwellings that don't have close-by parks and things where ... you need children to be able to go outside, then it can cause some issues. (Participant 32)

Participant 71 suggested a 'build it and they will come' type approach to increasing demand and therefore industry interest in MDH.

> When it comes to the roadblocks in pushing forward good-quality medium-density housing, maybe there does need to be some kind of mandate from either local bodies or the government saying "You need to do this" to kick start it, go. Because often once you get a kick-start, the market kind of goes, "Oh, this isn't a bad thing" and off they run, and so that initial hump is gotten over because people get used to it, they learn about it, it's no longer risky or scary to them because they now understand it and then they just keep on going. (Participant 71)

Community acceptance or demand for MDH is something of a circular issue. The building industry is likely to have more interest in delivering MDH if they perceive consumer demand to be increasing over stand-alone housing. However, the market will remain naïve to the benefits of MDH living if the building industry continues to deliver predominantly stand-alone homes in the meantime. The government is likely to play a significant role in addressing this with the roll-out of KiwiBuild, which will be predominantly MDH typologies. If these KiwiBuild MDH developments are well executed and consider all the concerns around amenity and infrastructure, demonstrating the benefits of MDH to the consumer, consumer demand for MDH should increase. This should in turn increase the building industry's interest in delivering more MDH.

6.4 Regulations are a barrier to delivering MDH

New Zealand's regulatory systems affecting the development and building of MDH were perceived by participants to be a roadblock to delivery. 71 participants discussed regulatory barriers and mentioned them 157 times. The Resource Management Act (RMA), the process of gaining resource consent, the building consenting process and Code compliance certification were all talked about by participants as being problematic. The system was frequently described as inefficient or time consuming.

> It only takes a third to half the time to actually construct and hand over. The rest of the time is spent in the process of getting approvals. It just shows you how inefficient the bureaucratic process is. (Participant 41)

Resource consent was perceived to be a very long, complex and expensive process, which was putting smaller building companies off moving into MDH. Many participants suggested regulatory changes to smooth out this process might help, though none of them offered any tangible solutions.

> If you look at sort of the average house-building type person, … the challenges they've got to get their designs approved and through the process is probably a lot simpler than it would be for a medium-density building. So I'd be expecting that it would be quite a lot more challenging to get it through the resource consent process, and that's potentially a barrier to a lot of smaller businesses getting into it, because they see this sort of quite daunting process … requiring a big investment upfront with a somewhat unknown outcome. So I imagine a smaller company that's not experienced in it is gonna be reluctant to rush in to it as opposed to building a spec house on the back of a section, which they're used to doing. So whether there's something around that that could be … able to make the process a bit easier to go for … medium-density housing. (Participant 19)

Some participants said that the difficulty gaining resource consent was due to inefficiencies and inexperience in councils. Participant 52 said the costs associated with compliance were high because of a lack of experience within consenting authorities.

> Does the council know what they're doing? So if I'm a developer and I need to go to the bank and get money, and I walk into the council, they've got no idea how to assess and then approve a resource consent for a building because it doesn't have the experience and then why the hell would I even start? Why would I even think about it because it's going to be months and months of work and it's going to cost so much money, and it's like that's one major barrier. I think let's ... make the maths easy ... to build an apartment, just one unit, is about 400,000 grand, just materials and labour etc, etc for a small unit, let's say 80 metres squared. I've seen some studies that say about 100,000 or maybe it's 120,000, it's regulatory, it's all consents, it's regulatory, and really what that says to you is that council doesn't know what they're doing. If they have to actually spend a quarter of the total cost of a unit on regulating, consenting that, then they're either acting as a monopoly in seeing that money is available and they're the only you know supplier into that monopoly or they don't know what they're doing and it's just huge costs ... I think the barriers are a lack of experience. (Participant 52)

Participant 53 described how issues with the RMA become everyone's problem as they are passed from one player in the process to another. This takes considerable time to work through.

> So the Resource Management Act is a problem, which causes the council a problem, then it's passed on to us as a problem, and then it passes back to the developer as a problem, and so there's a sequence of backwards and forwards events to go through before you can resolve things, which adds a huge amount of time to things. (Participant 53)

The building consenting process was also frequently mentioned as something that deters builders and developers from investing in MDH. The process was seen as one of the major stress points for developers.

> And that's what's holding back a lot of people. Most people can't handle having to put up with all the hassle you have from councils for getting building and resource consents. You know it's a highly stressful job, development, and a lot of that stress is caused by the councils. (Participant 41)

Building consenting was perceived to be a roadblock to the delivery of MDH from both the consenting officials' side and the applicants' side of the process. From the perspective of building consent officials, designers must understand compliance for councils to consent MDH.

> Because you submit a consent and we've got all sorts of cladding selections there, and as processers, we throw our hands up and say how does it comply? The designer doesn't know how it complies because they don't have the knowledge to actually have answered some very basic questions when they made the selections. They should have been answering them when they made those selections, so, yeah, it puts a roadblock on, we can't consent, so that stalls, on and on, it's just a bottleneck. (Participant 24)

From the applicants' perspective, participants said gaining a building consent for MDH is an arduous and overly complicated process that adds expense to the overall build.

> Well, in Auckland, Auckland Council are a major impediment ... the consenting process is ... oh tortuous is not quite the right word, but it's very inhibiting ... and time consuming, and so resource consents, building consents, most of the stuff is done on borrowed money, so money has a significant cost ... and time increases that cost – and so to get from concept to actually building the thing ... is too long winded. (Participant 99)

Participants also acknowledged that BCAs were stretched for resources and that the consenting process is now more involved than it was in the past.

> There seems to be shortages within the building consent authority as well, just in terms of getting enough people to carry out the inspection regimes required ... just even getting stuff approved or getting it inspected, which is also a bit of a reflection on the current systems. They're quite complicated and require multiple inspection steps. So, down the path, I don't know, we might have got away with a handful of inspections, now a lot of our jobs even on renovation we've had upwards of 12 to 13 inspections. (Participant 114)

As well as the clear frustrations with the consenting processes, the Building Code itself was described as also being part of the problem. Several participants noted that the Code fell short of ensuring buildings were built to a good standard.

> As far as I'm concerned, the Building Code isn't high enough, and when a builder builds to the Building Code, they're literally building a house as badly as they can without being thrown in jail. That is how the Code works. (Participant 8)

Some participants also explained that the Building Code didn't adequately address issues around MDH, leaving it open to interpretation and dependant on consultants to demonstrate compliance for some typologies.

> I should have pointed to the Building Act and the New Zealand Building Code as being a roadblock in a lot of cases. And as someone who's old enough to have been involved a little bit in the transition in the early 90s from the old Construction Act to the Building Act – which was meant to be a performance-based approach to building and has become terribly prescriptive – I think we have developed a system which... on the one hand achieves what it sets out to achieve quite well but makes it very difficult to step outside the frame and try other approaches. I think we really need other approaches, and I think the Act has actually failed dismally in achieving that, unless you have massive financial backing to get all the testing and authorisations and the BRANZ certificates and so on done. So I'm critical of the overall approach to applying the Building Act, if you like. (Participant 92)

In summary, there was broad consensus among participants that the regulatory systems currently in place diminish the industry's interest in and ability to deliver MDH. The amount of time it can take to gain resource and building consent increases the costs of development to the point where some builders and developers shy away from taking on such projects. The complexity and cost of this process likely contributes to the perception that only large construction companies with significant financial backing are able to deliver MDH. Many participants said that changes to the regulatory systems

would help, though few made suggestions for what these specific changes might be. The comments made during these interviews would suggest that better resourcing consenting authorities to improve capacity and speed up the process would alleviate much of the frustration experienced by the industry. Upskilling consenters and applicants around compliance would also help the process. Updating the Building Code so that it makes better provisions for MDH typologies would also make it easier for industry and consenters to work together on getting MDH consents approved. If the consenting processes were improved so that time and money were saved, more of the building industry may become interested and able to deliver MDH.

6.5 The drive for profit disincentivises MDH delivery

The final major theme is that the drive for profit acts as a disincentive for MDH delivery – other building typologies offer lower risks and greater profit margins compared to MDH. The higher risks and costs of building MDH can be attributed to several factors, including the issues identified in all the themes reported here so far. 66 participants spoke about this theme and mentioned it 163 times.

> If you just leave it up to people making a profit, that isn't going to work because that's what we've got now. They're building great big houses on small plots of land, which make a return, and people think they're buying that for value, which possibly it is because it still sells. (Participant 28)

Participant 40 was asked how they thought the building industry could be encouraged to deliver MDH. Their response was one example of a sentiment that ran throughout this theme. The way the industry is currently set up to follow the greatest profit means that the housing being delivered will not necessarily be the housing New Zealand needs or of a high standard.

> I'm really not sure how you can get people to do that. It's an ethical investment on the part of those involved in the design and the construction of the things, and I just don't think that that's really a part of New Zealand's construction culture. It's build it and forget and get paid and then say, "No longer my problem, it's done, it's the owner's problem". (Participant 40)

One way of avoiding risk and protecting profit margins is to keep with what you already know, and in many cases, that is building stand-alone houses. When the industry is in a boom period and builders can pick and choose which projects to take on, they are unlikely to step outside their comfort zones. It will be difficult to generate interest in MDH among builders who already deliver other typologies with all but guaranteed profits.

> They've been stretched out of their comfort zones I guess. Yeah, if you are a residential house builder and you've got plenty of work in front of you of stuff that you know how to do and there's not much of a risk, why would you do anything different? ... the fact that the industry's so busy, trying to get them to do something different is ... gonna be a challenge. I mean the risk, you know, for doing something new. (Participant 19)

Uncertainty about consumer demand for MDH adds to a lack of interest in building these kinds of houses. Again, the risk of not making a profit on a development deters builders and developers from scaling up. This subtheme links to the earlier theme of community acceptance of MDH, where participants also doubted consumer demand for MDH.

> Once we get a couple under way, are they even going to sell? We're doing it for ... a private end user at this stage. So what if they don't? ... we don't even know what the market is like. We've talked to a lot of people, and we believe that there will be demand, but to be honest, at this point, ask me again in about 12 months and I'll tell you if there is or not. (Participant 21)

Some participants said that the drive for profit meant that larger companies were more likely to have the ability to deliver MDH. Participant 8 said that these larger developers made it more difficult for the rest of the industry to do MDH. Participant 53 provided more context, explaining that larger development companies have the experience and skills required to deliver MDH more efficiently, making their product more competitive on cost while still making a profit.

> The profit focus of the larger developers and the clout that they have in the industry is a roadblock to the wider industry getting involved in medium-density housing. (Participant 8)

> Their ability to deliver depends on their skill set that they've got, and there's very few dedicated developers who've got sufficient experience to deliver a lot of that type of work. It's mainly relying on the larger companies probably such as Hawkins and Fletchers to deliver with a few developers that can seem to handle that sort of complexity with the work. But the smaller developers are seriously underpowered and underskilled in being able to deliver those projects efficiently and equally on cost, which affects the increased costs of properties and things. (Participant 53)

The drive for profit was also seen to erode the quality of houses delivered. Participants described how cost cutting for the sake of increased profits leads to poorer-quality products. This is not just relevant to MDH. However, if margins on MDH developments are tighter, the motivation to cut costs and eke out more profit may be stronger.

> I've seen some builders ... teams that have been together for a while ... being more clever about building multi-storeys and working with good architects to assist that ... I suppose I would say good design is worth gold. And where builders and developers try and cut corners on design expertise, they deliver a worse product ... and they might not necessarily save money. So where architects can work with builders and developers closely and collaboratively, I've seen really good results, both in terms of cost and the quality of function and design. (Participant 10)

> In an ideal world, a builder should be responsible for the building they build, they shouldn't be able to get out of it ... if a builder can be not responsible for a building once it's completed, then if they change the building materials from a high-quality building material to a poor-quality building material, the price difference doesn't go to the people buying the house, the price difference goes directly into the profit of that developer. So there's a profit motive which is blinding the developer from taking responsibility for that house, especially if he knows that he can wind up that company and move to the next one being in no way responsible for any of the decisions he's made. But if he carried the long-term responsibility like an architect does for his building, he would start to say, well, "I don't want to replace a good-quality [product] with a building product that's a cheap one because I'm going to be responsible for that cheap one and I don't want to go back and fix it. I'm going to put in a good one." (Participant 62)

Some participants suggested that government involvement was a potential solution to the drive for profit disincentivising the industry away from MDH. Lower profit margins may be more acceptable to builders and developers if the financial risks are reduced. Participant 46 suggested that more builders could be interested in delivering MDH under a government-run lending scheme. Government intervention raised in this context demonstrates further interlinkages between all the themes described so far. In this example, the participant said that if the government is going to help with lending and risk reduction, they should also be receiving a share of the profit.

> All complexes ... especially high density, they need funding ... good individual builders don't have the funding always to do it. Now if there was a funding stream to do it, you know, instead of going to a bank, it was done through a government agency and that funding was there to build those apartments and then that money came back to government when they were sold and there was a profit share split between the builder and the government, the government makes money, the builder makes money, and everybody's going to keep on wanting to do it. But the problem is it's left up to developers to do it, and there's only one person making the money and that is the developer, and I think that's just totally wrong. (Participant 46)

A few participants pointed out that, ideally, the industry should be building in the interests of communities, not just for profit.

> Accountability is important for the long term ... you don't want to be building these buildings and in 5 years' time things change, so you want to make sure that you're building for the long term, not only to make money but for the community, that the winner in the end is the community and the dwellers in the buildings not the developer. So it's really important that it's not all about profit but it's also that the end user also has a benefit and the quality of life is maintained for the end users for 50 years, 60 years, when the developer is long gone and moved on. (Participant 32)

Overall, when discussing the profit-driven nature of New Zealand's building industry, participants perceived it to be an impediment to the delivery of MDH. There appears to be no incentive to entice builders and developers out of their stand-alone house comfort zones where profit margins are more secure. Larger firms with more experience and expertise in MDH typologies can deliver them more efficiently, making it difficult for smaller, less-experienced companies to enter that market and compete. MDH was perceived to carry with it more risk, especially around consumer demand. Government lending schemes to reduce financial risk to developers and builders were suggested as a possible way to encourage them to move into MDH delivery. The issue of cost cutting to increase profit margins will need to be addressed if we are going to attract more of the industry into MDH delivery. It will be important that the industry delivers good-quality MDH that increases consumer demand for these typologies in the future, which in turn should provide more security in profit margins for industry.

6.6 Summary of interest and ability to deliver MDH

The five major themes described here were not the only ones that emerged from the data set. They were the themes that were talked about most often by participants and so have been described in detail because they dominated participants' discourse around industry interest and ability to deliver MDH. However, in qualitative research, the less-dominant themes (Appendix A) are no less important, and the reader is

encouraged to take them into consideration. Many of the themes and subthemes are interrelated and tell the complex story of all the factors that contribute to the industry interest and ability – or lack of – to deliver MDH.

The overarching theme for interest and ability was that of government responsibility for resolving barriers to MDH delivery. Government intervention was a major theme, but also a subtheme that featured as a solution to all the other barriers identified as major themes – finance, community acceptance, regulations and drive for profit. The political context in which these interviews were conducted is relevant. These interviews were undertaken during a time of political uncertainty during an election in which the 'housing crisis' was the main election issue. The main political parties were all promising to address increasing homelessness, skyrocketing house prices and decreasing rates of home ownership in New Zealand. In this political climate, the building industry can hold the government responsible for resolving the issues preventing delivery of housing for New Zealanders. It is no surprise then that, when barriers such as access to finance are discussed, the building industry is looking to government to secure loans and underwrite risk.

Interestingly, participants did not generally suggest the government should build MDH itself. Housing New Zealand was sometimes suggested as a suitable government agency to deliver MDH, although even Housing New Zealand relies on private industry to carry out the work. There is an element here of market protection. The government is expected to assist with financing the delivery of MDH and even supplying the land to be developed. However, the industry does not go so far as to say the government should take over the delivery of MDH completely. Participants were largely in favour of partnering with government in various ways. Some suggested arrangements should be mutually beneficial to facilitate further government involvement in the delivery of MDH through profit-sharing schemes. The perceived success of Hobsonville Point has no doubt demonstrated the potential for public/private partnerships to work, and the industry appears to have an appetite for more of these types of developments.

Central and local government were also held accountable for regulatory barriers to MDH delivery. There was strong sentiment from participants that the resource and building consenting systems were time consuming and an expensive hurdle to navigate for MDH. Participants spoke passionately about their frustrations with New Zealand's building regulations, and this can be seen in the language used in some of the interview excerpts in this report. Interestingly, there was agreement from both sides of the building consent process that the system is inefficient. Under-resourcing and apparently high turnover within BCAs appears to be putting a strain on the system. Attaining resource and building consents has become a significant portion of the overall delivery cost for MDH and was described by many participants as the most stressful part of being a developer. Consenting is a fundamental cog in the wheel of MDH delivery. Unless the issues around the time and costs required to get consent are alleviated, it is unlikely the building industry will see the benefits of delivering MDH.

Making a good profit on MDH would be one way to incentivise more of the building industry to move towards its delivery. Profit margins on MDH were described as smaller than for stand-alone houses or at least not large enough to outweigh the significant additional financial risks involved in delivering these typologies. Remedying the issues around consenting and having the government alleviate some of the risk in MDH development might make the profit margins on MDH a more attractive prospect for developers and builders. More certainty over consumer demand for MDH might also

help to lure smaller industry members away from the security of their stand-alone house-building 'comfort zones'.

Community acceptance and demand for MDH was an issue participants expressed uncertainty about. It was interesting that, despite the acknowledged success of Hobsonville Point, which is predominantly MDH, the building industry remains unconvinced of the popularity of these typologies. Participants were aware of the importance of amenity and infrastructure for MDH neighbourhoods. It may be that their scepticism over demand for MDH typologies stems from a fear that neighbourhoods will be built without due consideration for amenity. In other words, if 'bad' MDH is built, no one will want it and New Zealanders will be put off these typologies forever. Conversely, if good-quality liveable MDH is delivered, the benefits of medium-density living will be realised by more New Zealanders, and demand for MDH should increase. Based on the results of this study, the building industry appears to be aware of the importance of these liveability considerations.

In summary, if the New Zealand building industry is to broaden its interest and ability to deliver MDH, the government will need to support it to do so. Issues around access to finance, cost and inefficiencies associated with our regulatory systems, drive for profit and doubts around consumer demand mean that MDH delivery is currently left to larger industry organisations. The recently announced KiwiBuild scheme aims to address some of these issues. It will be important to continue engagement with the building industry to check whether this scheme has increased their interest and ability to deliver MDH. It will also be important to understand what else can be done to make MDH delivery more attractive to a broader range of industry members.

7. Analysis: Skills gaps and shortages

Themes for this research question are reported slightly differently from the previous section. For this part of the study, the researcher looked for specific industry areas where skills gaps or shortages existed as well as more general or overarching themes about MDH skills. This resulted in a larger number of individual themes that identified specific industry areas where gaps or shortages were mentioned. In a traditional thematic analysis, these themes might be grouped into one overall theme of skills gaps. However, for the purposes of this research, it was important to report each area of the building industry where a skills gap or shortage was identified.

Some overarching themes were also identified, and the most frequently discussed ones are described in detail. All themes, including those that identify specific industry skills deficits, are presented in Appendix B. There you can see what major themes emerged from the data, a brief description of the major theme and the subthemes that formed the major theme. You can also see the number of participants who spoke about the theme and the number of times the theme was mentioned across the entire data set.

22 major themes emerged for the research question “Where are the skills gaps for MDH?” This section of the report begins by briefly describing which sectors of the building industry were identified by participants as being affected by skills gaps or shortages. The second part of this section describes the most dominant of the overarching themes that emerged when participants discussed the state of MDH skills in the New Zealand building industry. These discussions provide greater insight into the possible reasons for skills deficits and potential solutions, therefore this report places more emphasis on these overarching themes.

For clarity, the reader should be reminded that a skills gap is when the people working in the industry do not have all the knowledge required to deliver an outcome. A skills shortage is when there are not enough skilled people in a sector of the industry to deliver that outcome. This report covers both these concepts, as skills shortages were raised by participants as well as skills gaps.

7.1 Skills gaps and shortages by industry sector

Participants discussed 10 areas of the building industry regarding skills gaps. Some referred to specific trades, while others identified certain skill sets that might be lacking across several trades. These are described below in order from most frequently mentioned to least frequently mentioned.

7.1.1 MDH technical skills gap

Skills specific to MDH are lacking in the industry. These include skills around fire spread, acoustics, façades and liveability. This skills gap crosses over into multiple sectors of the building industry. 43 participants mentioned this 62 times.

> So you get a bunch of unskilled labour, and that’s where you get issues too … you might get away with that in a one-off build, but if you’re doing MDHs and you’ve got all these extra issues – fireproofing and soundproofing and waterproofing between the units and everything else – if people don’t actually have the skills to construct those all the time and properly, then they just get missed, and you look at some of the problems we’ve got now with some of these bigger units because the just get slapped up. (Participant 38)

7.1.2 Design skills gap and shortage

This theme was multi-dimensional. It included that:

- designers in the industry do not have all the skills required to design the MDH we need (skills gap)
- there are not enough designers skilled in MDH (skills shortage)
- other tradespeople in the building industry do not have the skills to interpret/build to MDH designs.

29 participants mentioned this 44 times.

> I think there is a skill shortage in architecture with the architects that are really connected with the building process and the construction elements. I probably have a different approach, simply because I spent a lot of time draughting, and I still draught our own stuff as well as doing all of the … overarching elements like contracts and meeting clients and site observation. But because so much has changed since 2004, I feel like there's a whole group of architects that are still practising that are very disconnected from how things are built and the level of documentation that's required and the quality of that documentation … from builders that I work with and also from other architects and I know there's this attitude of, "Oh well, you know, we'll just draw anything and the council will check our work and then we'll chew up all this time in RFIs, and … if it gets through that, then, and it's still not right, then we'll just sort it out on site". And I think that that's really not good enough. And so I'm quite happy to be critical … of my own profession in that way. And I think that we can do better, a lot better. That's one big element. I also think that there is a skill shortage with perhaps competent people that can go out to a site and understand what's been drawn versus what they're looking at on the page, and whether that be an architect or a draughtsperson or a project manager, that is across the board, and I get a lot of feedback from that, from builders too. (Participant 119)

7.1.3 Prefabrication/automation/innovation skills gap

The industry does not have the skills required to fully utilise prefabrication/automation/innovation in the delivery of MDH. The use of prefabrication and other technologies was also identified by participants as part of the solution to skills shortages, as it reduces the number of tradespeople required to deliver MDH. 25 participants mentioned this 38 times.

> But they end up building in-house, under cover, as per two working examples in New Zealand, and Fletchers is not far behind, their modular homes. They know they need a skill set which is not about showing up on site with a hammer and a tape measure. They need a skill set which is managing equipment to build in volume, and then past that point, they need a skill set to manage how those products are serviced and delivered to site, health and safety risks, cranes – we're dealing with a vastly different beast. So it's the technology and the direction that we take that starts to establish the need. And everything fits into place quite quickly from there. It becomes very obvious what walk of life you need and where these people need to come from. Unfortunately, many of them can't come from the building industry because their education level or understanding of that technology or even computer management is very, very low. And this would be a major problem if we moved too quickly into thinking modular construction as per the rest of the world is

> going to fix our problems, because you still need the skills to manage the volume that we require through modular or panellised methodology, and we don't have them. (Participant 80)

7.1.4 Project management skills gap

Project managers in the industry do not have all the skills required to deliver the MDH we need. Project management is a particular skill set, and project management for MDH is more challenging than traditional stand-alone house builds. 22 participants mentioned this 35 times.

> Yeah, in our opinion, this isn't a fix to come via throwing more labour at the problem. This is a fix to come via better management, more skill set and the logistics management, the project management, the integration of that skill set. We lack these people ... they come first or else we're going to have a lot of problems with build quality, even if we had more people. So it's definitely at that level of project, business and construction management that we need filled. (Participant 80)

7.1.5 Builder skills gap

Builders in the industry do not have all the skills required to deliver the MDH we need. 28 participants mentioned this 34 times.

> And then if you go to the construction side, I think there is a skill required by builders, I don't think you can take the skills of a builder who builds very good houses on a daily basis into an apartment style construction. It's a complete new set of skills, and it doesn't just mean, oh yeah, I've heard of this and I've seen it somewhere ... some of the things that are critical within apartment-style building are not critical within a single house, and lots of them are to do with noise transfer and with moisture transfer, so they're technical things, and if they are executed wrongly – someone just forgets to put some noise insulation around the pipes – then the whole thing just falls flat. (Participant 45)

7.1.6 Regulatory skills gap

There is a lack of knowledge in the industry regarding the RMA, consenting and the Building Code for MDH. This skills gap was predominantly described as being within BCAs. 17 participants mentioned this 22 times.

> Then I think the lack of ability to work together depending on who you're dealing with at council. When you have people that are versed in it and experienced at the council end, you can get some really, really good results. However, if you do not have that, if people at the other end do not understand the value that you can gain, for example, by putting them closer together but reorienting the buildings by creating a playground close by, by sharing the street environment – so that's understanding the other disciplines, that's understanding traffic and transport and landscaping and all that. So if at council level that's not understood, the person you deal with – so you need a particularly trained person at council to deal with these applications, I believe – and they need to be able to read the plans and see the deficiencies as well as then being able to guide the developer or whoever is producing this towards a better solution. So they need to be really highly skilled at council because that's ultimately – they have the power to actually approve something or not. So

> that's one part. And I think … if skilled people are there then they also should be given the power to actually do their job. Sometimes their hands are off and I hear, "I would love to do this but my hands are tied behind my back because this is what the rules say". (Participant 45)

7.1.7 Developer skills gap

The developers in the industry do not have all the skills required to deliver the MDH we need. 6 participants mentioned this 9 times.

> There's some really good developers. There's one we're working with at the moment … he's onto it, you know, whereas other developers you work with, it's just an uphill battle, because they don't understand what they need to supply and in many cases they've sold it before you're involved in it. You know, like they've got some glossy pictures and a pointy-shoed salesman, away you go, you sell 'em, and then you try and deliver what you've sold, which you can't do, because they've sold something they're not allowed to make. (Participant 2)

7.1.8 Engineer skills shortage

We do not have enough skilled engineers to deliver the MDH we need. 6 participants mentioned this 7 times.

> Currently, we're working with some Australian engineers, you know, because the engineering – it's difficult to get engineering in a timely manner. (Participant 2)

7.1.9 BCA skills shortage

BCAs do not have enough skilled building officials to consent the MDH we need. 5 participants mentioned this 6 times.

> There seems to be shortages within the building consent authority as well, just in terms of getting enough people to carry out the inspection regimes required. (Participant 114)

7.1.10 Finance skills gap

There is a knowledge gap around the financing of MDH. 4 participants mentioned this 5 times.

> Starting with the financial side and when people put a project together and not knowing at what point the money is actually needed in the process. Applying the same sort of rules as you apply to building a house because if they have got five houses must be the same as one house. And it's not the case, and at the same time therefore not understanding where savings are made in terms of – because there is quite a bit of duplication within [MDH] where there should be some savings or … the ability to bulk buy and making good use of those sort of things. So that's a lack of understanding where the money needs to be put to actually save the money somewhere else. (Participant 45)

These areas of skills gaps and shortages in the building industry provide insight into where investment in training and upskilling should be made. The overarching themes around skills gaps and shortages described in the next part of this section gives

context around the reasons why these skills deficits exist and what possible solutions there might be. Finally, one area of skills shortage was specifically mentioned.

7.1.11 Builder skills shortage

There are not enough skilled builders in the industry to deliver the MDH we need. This skills shortage was not specific to MDH – it was described as being industry wide. Plumbers and bricklayers were sometimes mentioned alongside carpenters as part of this skills shortage. 27 participants mentioned this 34 times.

> So we've seen the building trade suffering from shortages, and at the moment, it's bloody hard to get a builder. (Participant 5)

7.2 Overarching themes around skills shortages in MDH

11 broad themes around skills gaps and shortages in the building industry for MDH emerged from the data set. Many of them included or overlapped with the specific industry skills gaps themes. All the themes that emerged can be seen in Appendix B.

The dominant themes are described in more detail here.

7.2.1 MDH skills shortage

This theme was the most dominant in the data set regarding skills. It was mentioned by 98 participants 186 times. Participants said there are not enough skilled workers in the industry to deliver the MDH we need. It was common for participants to state that the shortage was industry wide – not just affecting the delivery of MDH but all housing supply. This was a very homogeneous theme with little diversity in responses. Many participants, when asked if they believed New Zealand had enough skilled workers to deliver the MDH we need, simply replied "No".

> Um, where do I start? I mean ... it's industry wide. I mean it's ... the whole industry. There's ... not enough people in any role. I can't think of any role, off the top of my head, where there's a ... surplus of skilled employees. (Participant 18)

> The fear would be is that there's shortages of skills across the industry and so it's not medium-density specific. There's shortages everywhere. (Participant 19)

> I don't know what the rest of the country's like, but we're basically – we've got a shortage of skilled carpentry staff. We've got a shortage of most skilled subcontractors – I mean bricklayers especially. There's just a shortage in general, just based on the amount of work that's being done at the moment ... we've luckily got, you know, quite a wide range of people that we use and so we're not too badly affected, but pretty much every subtrade is under the pump. Everyone's really, really busy. So yeah ... I think it's an industry-wide issue at the moment. (Participant 21)

> Any of the licensed areas. The builders are in short supply, the plumbers, the electricians, they pick and choose the jobs. You know there's short supply of even people doing the concrete foundations, getting good earthworks guys on is difficult, getting public services, drainage and stormwater and sewage guys are really hard to get hold off – those guys. (Participant 41)

There was a high level of agreement among participants that there were not enough skilled workers in the industry to build the MDH, or housing more generally, that we need. However, a few participants did not think there was a skills shortage, though none explained why they believed this to be the case.

> My belief is, yeah, there's enough out there. (Participant 115)

> I don't really think there is a skills shortage. And I think from now on, quite possibly ... I don't know whether there's going to be quite the demand either. (Participant 123)

A small number of participants suggested some other ways of approaching the skills shortage besides increasing the number of tradespeople on the ground. Participant 89 pointed out that a change in the way the New Zealand industry constructs houses could ease the skills shortage.

> Do we have enough people? It depends on how we're going to be building them. You know, if we're going to be building them in a traditional way, then probably not, because the way that building is done presently in New Zealand is very, very time consuming ... it's the traditional way that it's been done with a slab, a frame, building paper, another frame around that and then only do you start putting on the roof and putting on the GIB and then start doing the finishes. It's very time consuming. So possibly looking at alternative building methodologies that would end up delivering a lot quicker. (Participant 89)

One of the other themes identified in the data set focused on industry experience of MDH. This theme is not discussed in detail here, but it crossed over into the overarching theme regarding skills shortages for MDH. When Participant 7 was asked if we had enough skilled workers to deliver MDH, they described a shortage of tradespeople with experience building these typologies. They explained that they expect skills to grow with experience.

> Not with the experience, no. And I think that will change as more and more projects come along, you'll start to see that expertise being absorbed into some of these individuals. But at present, if you were to put an ad in the paper, particularly in the regions that I manage, and say, "Hey look you have to have experience with this product", I think we would be very, very limited in how many candidates you get. (Participant 7)

Participant 7's comment demonstrates the blurred area between skills shortages and skills gaps. They suggest that there is a shortage of skilled tradespeople with experience in MDH, but this shortage can be addressed by filling the skills gap in the existing workforce by learning MDH through experience.

To summarise, there was broad consensus among participants that there are not enough skilled tradespeople to deliver the MDH New Zealand needs. This shortage is industry-wide and affects the delivery of all housing, not just MDH. The shortage of skills for MDH delivery could be alleviated by addressing the MDH skills gap in the existing workforce. Skills gaps are discussed in the following section.

7.2.2 MDH skills gaps

In addition to not having enough people in the building industry to deliver the MDH we need, participants said the existing workforce does not have all the skills required to build MDH. Like the MDH skills shortage, the skills gap was described as industry-wide,

and affecting the delivery of all housing. However, there are MDH- specific skills gaps that prevent some tradespeople from moving into MDH delivery. 73 participants mentioned this theme 114 times.

Skills were often described by participants in terms of qualifications or experience. Participant 16 talked about how experience and being qualified give you problem-solving skills that others in the workforce may not have. Further to that, experienced qualified tradespeople are in short supply. Participant 86 explained that MDH requires a skill set that they believe few tradespeople have. Again, skills are equated with experience.

> So the guy who runs the company … he used to be my old workmate, and we used to work together. And before I came along … he was the only qualified guy out of 10 guys working for him. But like in saying that, the guys who were working for him had experience and stuff in the building industry, but if they were to be left alone … something that like required a bit of problem solving, they probably couldn't do it. Yeah, he was in need of someone with a bit more experience. He was looking for qualified guys, and he was finding it hard to find them. (Participant 16)

> I guess when you go above 3 storeys and up to 6, then that is a different kettle of fish completely and to be honest not one that we are willing to get involved in because of … the fundamentally different kind of design parameters, principles and all of that which come in to play, which how many of the proportion of trades have had experience in that? Probably very little. (Participant 86)

Though there was strong sentiment that skills gaps exist, some participants were confident that the industry did have the skills required to deliver MDH.

> Yes they do. Of course, training is always needed. It's not like you can stop at a stage and say I know everything. No, you've gotta learn day by day. But I think … they're [becoming] confident and capable … of delivering. Why not? (Participant 11)

> There is a skilled enough workforce out there … yeah, I would say that the workforce in the country is skilled enough to assist with the delivery. (Participant 14)

A lack of skills on a worksite was described as detrimental to the delivery of MDH. Unskilled labour was perceived to be a liability to the build, costing time and money, and creating more work for others on site.

> The skills at the moment … are stretched, so their jobs are taking longer, because people are making more mistakes, because they don't have the skills … it's hard work for a site manager these days to get it right, because a lot of people who turn up to site can't even read plans … they're not up to industry standard, and they still get charged out … as a tradesman sort of thing … without the time under their belt because … they're employed as subcontractors. They don't have the option to pick the cream of the crop – in fact, they scrape the bottom of the barrel, so to speak. (Participant 20)

Participant 23 spoke about an intergenerational erosion of skills as demand for more workforce pushes less-skilled workers further up the industry hierarchy of responsibility.

> But I mean I see it as a general problem … because what you have to bear in mind is that today's unskilled hammerhand is tomorrow's foreman, and that person has to provide supervision to the next generation that come behind them, and as each generation is getting less experienced and less supervision and less guidance, then the following generation of tradespeople is equally becoming less skilled and less supervised. (Participant 23)

Another reason given for the skills gaps in the building industry was the boom/bust cycle. The bust phase of the cycle was described by some participants as undermining skill development and retention. Participant 3's comment also links to another major theme that is discussed later – the building industry is an undervalued career choice and it's difficult to attract "good people".

> So I think the cyclical nature's a real issue. So again, that's possibly something where … there could be some government-type intervention to sort of smooth out the highs and the lows and sort of retain the skill set … and also make it a safe career, I guess, for people, to get good people in the industry. I think that's really key, because it's very, very hard if you've just got extreme highs and then extreme lows … I think that's the biggest challenge. (Participant 3)

Failing to stay abreast of best-practice approaches to building was also mentioned as contributing to the skills gap for MDH. A lack of ongoing training was suggested to be part of the problem, highlighting that perhaps skill development isn't as common as would be expected for a constantly evolving industry.

> I think the skill set of our construction industry is pretty low, and it's something we see all the time. The experience of the leaky buildings 10, 15, 20 years ago – I think there's still a lot of people who are used to doing things a certain way and struggle to do them in what's seen as being best practice now. There's probably a lack of skill in terms of the monitoring of that. (Participant 122)

Training and upskilling of the existing workforce is a major theme that was closely related to MDH skills gaps. The next section of this report describes how participants emphasised the importance of upskilling as a solution to the skills gaps described here.

In summary, skills gaps were a major issue for many participants. Most participants who spoke about them said that skills gaps in MDH were an impediment to delivery. However, a few expressed confidence in the level of skills in the existing workforce.

Often skills were equated with experience of MDH, leading to a curious Catch-22 situation – you need skills to gain experience, but you require experience to gain the skills. The importance of mentorship and supervision is obvious here. More senior industry members with experience delivering MDH will need to oversee the 'learning on the job' aspects required to upskill the workforce in MDH delivery. A few participants mentioned that the subcontracting model the industry currently works in undermines investment in skill development. The building industry will need to address this issue if it is to ensure its workforce is equipped to deliver quality buildings in an efficient manner.

The word ‘qualified’ was used interchangeably with the word ‘skilled’. This might indicate that the industry values ongoing education as a pathway to skill development. Some participants acknowledged the time it takes to complete qualifications and warned that the industry and the housing market will need to be patient, as these skills will not be gained quickly. It should also be noted that not all the workforce will accept the need for ongoing training and upskilling. Therefore, it will be important that best practice is incentivised and build quality will need to be closely monitored as MDH delivery ramps up.

The next section of this report describes the theme of upskilling the existing workforce as one solution to MDH skills gaps.

7.2.3 Upskilling of the existing workforce

The next major theme was that ongoing training and qualifications are necessary to upskill the existing workforce. 62 participants mentioned this theme 117 times.

Training specific to skills gaps in MDH was suggested as a potential solution that could improve its delivery. Formal study and gaining qualifications beyond the completion of an apprenticeship was often suggested to address skills gaps. It was common among this sample for skills to be equated with qualifications, emphasising the value industry put on education and training. Participant 3 discussed training in some of the non-trade areas that were identified as specific skills deficits in the industry – finance and project management.

> I definitely think there is a role for formal study-type options … looking at that whole finance and sort of packaging up projects and … all the sort of steps along the way, which are quite complicated … but it’s time consuming too … I think that’s always the issue. Everyone from outside the sector thinks we can get things kicked off quite quickly, and it just never happens that way. So it’s that whole time management and managing risk and finance and all that. I think there is … a real need for sort of formal courses really – qualifications. I think that would actually be quite useful. (Participant 3)

Trade skills in MDH were also in need of development. Participant 110 talked about the lack of training in MDH during apprenticeships and the limited opportunities for learning MDH on the job once apprentices are qualified. Upskilling and additional training post-apprenticeship is suggested as the solution to this situation.

> When you go through your … apprenticeship in, say, carpentry … they only touch base on detached dwellings, probably buildings up to about 3 storeys, so they don’t have … a lot of experience if they go with smaller companies in terms of delivering medium-density housing. If they were to go that way … you’d have to join … those bigger corporate companies like Fletchers … all those other ones that have got those projects either on the go or in the pipeline. There definitely needs [to be], yes, more significant training … in terms of medium-density housing or upskilling. So whether … they’re block courses, not necessarily a 3-year course because they’ve already got the fundamentals … of construction behind them so it’ll be more … upskilling and block courses. (Participant 110)

Participant 118 suggested that skill development could be incentivised by providing a structured career path for tradespeople, where your position and pay scale is dependent on the level of skill you can demonstrate. Several participants mentioned

that a clearer career path for the trades would not only incentivise skill development once qualified but attract more aspirational people into the building industry.

> So as a member of Certified Builders, I presented 5 years ago a solution for part of these problems, which was actually to tier our industry right from your, say, on-site just hammerhand through to an apprentice, to your first, second, third year apprenticeships right through to your now qualified carpenter, then your licensed building practitioner, site 1, site 2 and site 3. It could be tiered. You could have actually capped pay rates within each tier, skill sets that need to be obtained and reached, and actually show a young man, "Hey look, if you do this, you can actually get yourself to a position where you can start climbing your way up the ladder and create a career path", and they can actually see that they can actually get to a point where they're not just earning an hourly rate, but they can get to a point where they are getting good pay, they can get margins on what they're doing, there can be bonuses. Have some incentives there and then get our young men into good formal training and wanting to go and upskill and upskill and upskill. We don't have enough people doing that. We don't have enough skill set. We're losing what we used to have. (Participant 118)

Participant 70 provided an international example of how a structured career path can encourage skill development. The absence of a system to recognise skill and experience in the New Zealand building industry means that our best tradespeople cannot be identified easily.

> In Germany, they have builders, and then they have the meister or the master ... to actually achieve that level or be able to call yourself a 'meister timmerman' you have to actually spend X amount of years in the industry and do some extra training to achieve that level of qualification, whereas if you wanted to just stay a builder all of your life you could. You know, you wouldn't have to do the extra training, and there are a lot of guys that don't want the responsibility, they just want to show up to work, they're qualified but they're not really interested in taking it any further. But then guys that are interested, there's not really much they can do to in terms of qualifications or training. (Participant 70)

On-the-job training was another avenue to skill development many participants suggested. Participant 65 offered a further example of the value of experience for building tradespeople.

> Obviously as more is done, people learn on the job. And I think – certainly I see with some of the people I've worked with that are doing their third or fifth, sixth, whatever, development – they develop a team that they know can deliver it, and I guess those particular subtrades or trades over time will have the skills. (Participant 65)

Participant 46 stressed the importance of on-the-job learning but warned of the risks when employers offering the training are unskilled or inexperienced themselves and ill equipped to pass on MDH knowledge.

> The ITABs and the BCITOs, the training organisations out there are doing a good job, but they can only do so much. The training of our people has to be done and passed on by the employer. And the biggest problem is we're allowing a lot of second-rate employers to build, some are imports, some are local, and they don't have the ability to pass on knowledge because what they

> know is still limited themselves – especially companies doing a lot of development work and fast high rise. So the only way to learn the trade in this country is, it's got to be passed on by a more experienced person with knowledge. (Participant 46)

Participants were largely in agreement that the skills gaps around MDH should be addressed by upskilling the existing workforce. Many suggested further training should be available to assist the industry to broaden its skills base for MDH. Given the emphasis participants put on qualifications, offering (and incentivising) formal training in MDH skills would be one approach to filling the skills gap. One way to incentivise ongoing training would be to have a more structured career path where skills are recognised and rewarded.

On-the-job learning or learning by experience was a common subtheme mentioned by participants across several of the major themes presented in this report. While it is a valuable tool for developing MDH skills, this approach relies heavily on quality mentorship and experienced supervision on worksites. In the absence of formal training, there is a risk of learning bad habits or less than best-practice techniques. Learning by experience is a highly effective method of putting into practice what has been taught during formal training.

Throughout the interviews, it was evident that there was an underlying assumption that additional training was necessary because MDH skills were not being taught during apprenticeship training. The following theme looks at the issue of the lack of MDH in New Zealand's training programme curricula.

7.2.4 MDH is not adequately covered in training programmes

Another major theme that emerged in the data was that MDH is not adequately covered in training programmes. 37 participants mentioned this theme 57 times. This theme is closely related to the upskilling of the existing workforce, as it explains why there might be a skills gap to be filled. It was evident throughout the data set that the industry appears to accept that MDH is not covered during apprenticeship training. The following excerpt explains some of the reasons for that.

> There's something that within the basic training is not giving them the skills, but … to be fair, the skills haven't been needed until the last sort of 5 to 10 years on any sort of scale. So that's sort of understandable. And I guess most people in the industry haven't ever lived or thought of living in that type of development necessarily. I think there is still the mindset of the single family home, despite the fact that a lot of what is being built at the moment is terraces and apartments. (Participant 65)

The relative newness of MDH typologies and the industry's lack of experience both building and living in them has meant that training providers may not have recognised the increasing demand for MDH skills. Participant 7 talked about a "chicken or the egg" situation where the industry cannot decide whether to train apprentices to facilitate more MDH delivery or whether to wait for more MDH delivery to justify training their apprentices in those typologies. Again, in the absence of formal training, on-the-job experience is the default training option for MDH.

> That's a difficult one eh, because a lot of this extended from the apprentices and what they sort of break ground on, and there isn't a lot of this product in the market so these guys are not really getting trained in it because there's not

> enough of it. So it's the chicken or the egg really. We either throw them at this kind of product and they sort of make their way through it and eventually learn or you get your specialist people coming in, but then you are literally nicking them from places like Auckland where potentially there's been a lot more history of this type of product. (Participant 7)

Participant 16 described one of the pitfalls of learning by experience. When employers are motivated to deliver a building as quickly as possible, there is little incentive to invest in upskilling the tradespeople on site.

> But in terms of training, yeah, I think it comes … down to the employers actually seeing value in training their guys … I know a guy who's got a crew of about 20 guys, a reasonable size sort of team … but he splits them up into framing guys, so they just do the framing, and then … there's the cladding guys and then there's like another team, you know, for the finishing sort of thing. So they're all split up … he doesn't move them around … because he doesn't care, because he just wants … it to be done as fast as he can, and he thinks that if you just leave the same people on the same thing, it'll be done quickly, which is true, but people who are stuck on the crews, they lose out on the experience and they just become a worker within just doing just the one job rather than getting trained up and having the experience to lead say like a whole job. (Participant 16)

Training in MDH at apprenticeship level would make it easier for the employer in the previous excerpt to rotate his tradespeople around the various tasks on an MDH building site. If all the tradespeople in his team had skills across the MDH building process, they would be more versatile workers with broad experience and skills. It is likely that these tradespeople would find their jobs more rewarding and interesting if they are performing a wider variety of tasks. It would also make them valuable assets to the building industry and facilitate faster career progression.

Apprenticeship training was described as having changed over the years by some participants, and this was seen to have been detrimental to skill development. Participant 24 described how tradespeople are finishing their apprenticeships with more specialised skills that perhaps don't provide the same versatility as in the past.

> I would say there has been a bit of a dilution in the skill of an indentured tradesman, or even a quarter of them, and someone who comes out of their BCITO training, they're probably a little bit more kind of compartmentalised, they're skilled in certain areas but they don't have a wide range of skills. I am 50-odd years old, and we learnt everything in my apprenticeship, and so you could be a jack-of-all-trades, which gave you a little bit of insight on problem solving, whereas today I think you'll get a guy that's good at draining or good at cladding or something else, but he's not going to have the wider experience, which is probably what it is. (Participant 24)

Participants generally said that they thought there was a need for MDH to be covered during apprenticeship training. This did not just apply to carpenters or builders. The following excerpt demonstrates how MDH needs to be understood across all the trades involved in its delivery.

> You know that's my sound wall but the sparkie's going to come in and drill a hole through it and stick a plug there because that's where the client wants a plug but he needs to know that you can't do that … I would like to see more

> training in the apprenticeship stage – things that don't apply to your trade but affects other trades and if you're going to come across it. (Participant 38)

Overall, participants said that apprenticeship training needed to respond to changes in the building industry and be covering the skills required to deliver MDH typologies. Participants acknowledged the role employers must play in ensuring their apprentices are receiving adequate supervision and on-the-job training. This further highlights the importance of making ongoing training available to ensure that tradespeople providing supervision are themselves up to date and skilled in MDH best practice

Attracting the right people into apprenticeship training and trades is another related issue that participants expressed concern about. This is discussed in the next section of this report.

7.2.5 Trades are an undervalued career path

The theme that trades are an undervalued career path transcends building typologies, so this theme is not specific to MDH. Regardless, it is an important theme that is relevant to MDH skills gaps as addressing the issues described here will contribute to improving the delivery of MDH. 33 participants mentioned this theme 60 times.

Some participants voiced concern that trades are considered a second-best career choice for less-academic secondary school students. This impacts who takes up apprenticeship training and ultimately the quality of the building workforce. This was described by Participant 23.

> It has to start at secondary education level in my opinion. I'm speaking as an ex-tradesman myself, and one of the big problems that we have at the moment is that kids leaving school ... are not being shown the trades as a viable alternative to what is considered to be the default route of university ... most schools tend to take the view that, if you are not smart enough to go to university then you can get a trade as a sort of consolation prize, and I think that is an atrocious way to present the trades to kids who are looking for a viable career. And I think that devalues trades as a career choice with the consequence that a lot of people don't go down that route. They pick to go to university and get a degree in art history or something instead, and as a consequence ... a lot of people who go into trades are demotivated from the beginning because they are given it as a second-best option, which it isn't, and I think that sets the tone moving forward. (Participant 23)

Participant 23 went on to further describe how the undervaluing of trade careers ultimately impacts the workforce and building outcomes.

> And a lot of people within the trade sort of feel that they are undervalued, and it just demotivates them. That's not to say ... that's the only cause, but I think that is where it starts, and I think there needs to be a change in the mindset in the educational establishments around how trades are presented – that they are actually a career and not just something you do if you are not smart enough to go to university. And that is the way it is presented at the moment. The consequence of that, in the long term, is that you don't get the right calibre of person in the trade, which means that we're then ... heavily reliant on sort of an itinerant workforce, from overseas in many instances, who don't understand New Zealand building codes, who can't read English and who are poorly supervised, and we end up with the situation with lots of people working

> building buildings who don't really know why they are building them or how to build them, and no one is looking over their shoulder to see what they are doing and we end up with the situation that we have today where we have an atrocious build quality. (Participant 23)

Participant 10 pointed out that a career in trade work can provide opportunities to be successful and that university should not be the only or even the first option for academically capable secondary school graduates.

> A trade path for smart young people should be considered to be just as … viable a post-school experience as a university path … I strongly believe that … smart young people with an aptitude shouldn't necessarily go to university, that trade work can be very – you can be very successful in that and have a satisfying career. (Participant 10)

There are advantages to choosing to train for a trade career over university studies. Participant 74 described some of the advantages that could be used to promote trade career options to young people who might otherwise decide to enter academic tertiary studies.

> All these kids don't need to go to university … if they want a lifestyle, try and choose an industry, well we can train you, you can make money along the way, and do really well. You don't need to take on a big debt, you don't need 4 years without making a dime at university, you know, these are great opportunities to do other things … we need clever people in the industry, we really do. (Participant 74)

In addition to encouraging young people into apprenticeships, experienced tradespeople who take on apprentices will need to be supported to supervise them. For the trades to be a more valued career path, the people who take on the role of trainer and mentor must be valued as well. Participant 118 explained how a government grant made it easier to take on apprentices and do a better job of supporting them through their training. They also pointed out that training organisations need to engage with industry to better understand what they need from the emerging workforce.

> When they had the Christchurch earthquakes, we got given a government grant and I took on two apprentices straight away, and then bang, they stopped it dead. Now if they still had that grant, I'd definitely be taking on more apprentices because it helps me get them going, helps me get them some gear. We put the money that we got back into our apprentices to pay for their training. We supported our apprentices to get going. And I've taken on recently another apprentice, and it's been a different story altogether and a lot harder for us as a company to actually get him going compared to the little bit of support we had from the government with the other guys. So it does make a difference, and I think the whole licensing and training industry, there's not enough interaction from the training organisation with us at the coalface as businessmen of what we actually need to see coming out of their organisations onto site for us to go, "Yep, that's good for us to work with". So training to me is massive. It's the biggest part of where our industry is failing I think. (Participant 118)

According to participants in this study, there needs to be a shift in the way trade careers are presented to secondary school students making decisions about tertiary training options. Apprenticeships and trade careers are currently seen as the second-

best option for students who are not academic enough for university. The many advantages of trade training and careers need to be promoted to attract high-calibre students who will add value to the building industry workforce.

The implications of not attracting good-quality candidates into the trades is the potential for an increasingly poorly performing building industry workforce. This will lead to poor-quality building outcomes.

The final theme described in this report presents some examples of how skills gaps and shortages are affecting the quality and delivery of MDH.

7.2.6 Skills gaps and shortages are affecting quality and delivery of MDH

Participants sometimes shared examples they were aware of where a lack of skills in MDH had led to poor building outcomes. 45 participants mentioned this theme 78 times. Skills gaps on MDH worksites were described as costing time and money and negatively affecting quality.

Some of the skills gaps were not specific to MDH but affect MDH nevertheless. Sometimes it is unclear if these examples are the result of a lack of skill to undertake a task correctly or whether the tradesperson responsible for carrying it out has deliberately cut corners. This is the case for the example described by Participant 23.

> Recently, I was asked to look at a whole load of MDH buildings constructed down in east Auckland, and the build quality is absolute shocking. You know, when you're pulling out, looking behind cookers and things and finding the walls, people have formed holes in walls for gas pipes by literally smashing through it with hammer and putting a pipe through it. No one's actually thought to do the thing properly. So it is all hidden away, but when you start looking behind the cupboards and looking under the floors, you suddenly realise that all the stuff is just not happening. It is actually terrifying. (Participant 23)

Participants frequently mentioned that the labour-only or subcontracting model the industry operates under undermines quality workmanship. When a subcontractor works for a fixed price and is motivated to complete the job as quickly as possible, the quality of their work can suffer. Mistakes made are then left up to the main contractor or project manager to fix, at a financial and time cost.

> A lot of the guys are all labour only, and somebody's got to carry the can for them … they say they can do it, but by the time you realise they're struggling, you've got to fork out extra for gibstopping to sort out the shoddy workmanship and stuff like that. So carpentry, I've been lucky on the jobs we have – we have paid a premium to have them but they are scarce, decent carpenters are scarce. (Participant 49)

> From a trades perspective, yeah, you get a lot of people, and they're just bit players … you don't get the time because there's not enough money in the job so you've got to get in and do it quickly and get out or you're working for minimum wage, you know, so the motivation is just for people to get in and get out and the project manager can deal with it if it's a problem for the next guy or whatever. (Participant 38)

Skills gaps specific to MDH were described as having particularly serious implications for building outcomes. The impact of mistakes made on traditional stand-alone houses are amplified for MDH.

> We struggle with quality control and … things getting built right, even with a simple, you know, kind of E2 Acceptable Solution … buildings, houses and stuff, detached houses, and it feels like you do need a step up if you're looking at medium-density … the things that can go wrong … weathertightness and all the rest of it, are exacerbated by medium-density … if you build a 7-storey building that's leaky, it's so much worse than if it's just a house. (Participant 50)

> And then you get into the actual labour components, right, and the trades that are involved, and there are huge lack of skills around those particular areas, and again it comes down to people either thinking, "I'm just going to do this like a single family home" or "I'm going to do this like it's an office building" and then … things aren't getting installed properly, fire penetrations, you know ventilation systems etc etc, so I think there definitely is at the supervisory level as well, people who don't know what they're doing. (Participant 52)

> The economies that might come from medium-density are lost if the buildings have to be gladwrapped, replaced, upgraded, whatever, in comparatively short periods of time. (Participant 69)

It is clear from the examples given by participants that upskilling the building industry workforce must be a priority if they are to deliver the quality MDH New Zealand needs. This is especially true as New Zealand gears up to deliver significant numbers of MDH dwellings as part of the government-led KiwiBuild scheme. Issues around the impact the subcontracting model has on accountability for workmanship will also need to be considered as the industry takes on more MDH. Upskilling and providing additional training is unlikely to have a significant effect on building outcomes if time pressure and the drive for profit undermine workmanship. The distinction between genuine mistakes and corner cutting is unclear and is an area of research worthy of further investigation.

7.2.7 Summary of skills gaps and shortages

In the first part of this section, the specific sectors of the building industry that were mentioned by participants as being affected by skills gaps and shortages were identified as:

- MDH technical skills gap
- design skills gap and shortage
- builder skills gap
- builder skills shortage
- prefabrication/automation/innovation skills gap
- project management skills gap
- regulatory skills gap
- developer skills gap
- engineer skills shortage
- BCA skills shortage.

This list provides some insight into which areas of the building industry could be prioritised for upskilling initiatives, recruitment and training. In the overarching themes around skills gaps and shortages, it was evident that in fact the entire building industry

is stretched. Additional skilled tradespeople are required across all the trades involved in MDH delivery specifically and house delivery more generally.

Participants said not only were there not enough skilled people in the building industry but also many people in the industry do not have all the skills required to deliver quality MDH. Skills were frequently equated with qualifications and experience. Being qualified in a trade was perceived as ensuring a good level of general skill but not necessarily competency in MDH. Tradespeople needed to gain experience of MDH delivery to become skilled in it. This puts many tradespeople in a Catch-22 situation of needing MDH experience to gain skills yet requiring the skills to gain the experience.

Under the theme of upskilling the existing workforce, it was suggested that additional training to upskill tradespeople would be one way to address the MDH skills gap. Offering training and qualifications in MDH would resolve the Catch-22 situation around experience, as on-the-job learning would no longer be the only way to gain MDH skills. The value of learning by experience was recognised by participants but so were the pitfalls. Learning on the job relies heavily on skilful and knowledgeable supervisors who can pass on their knowledge around MDH. Specialised training programmes for MDH could be complementary to on-the-job learning and ensure both supervisors and those they are teaching have access to the latest best-practice principles.

The need for additional training in MDH skills was partly attributed to a lack of MDH content in apprenticeship training programmes. Participants said that apprentices should be learning MDH during their apprenticeships and that this would make them more versatile tradespeople once qualified. In addition to including MDH in training, participants said that the industry needed to attract more academic secondary students into apprenticeships. Trades are perceived as a second-best option for young people who cannot go to university. Participants explained that this impacts the standard of apprentices recruited into the trades and undermines enthusiasm for trade careers. It was suggested that the advantages of a trade career need to be promoted to young people making career decisions. Factors like gaining a qualification without taking on large student debt and future earning potential should be marketed to young people. Providing them with more clarity around potential career pathways through trades might also help.

Finally, participants highlighted the costs of not upskilling the building workforce in MDH. Examples of poor workmanship resulting in negative building outcomes demonstrated the importance of having a skilled workforce accomplished in best-practice building techniques. Participants described how the subcontracting model much of the building industry operates under can undermine build quality. Subcontractors are not perceived as having accountability for their work. When corners are cut or mistakes are made in an effort to save time, remediation is left up to project managers or the next subcontractor. Whether upskilling the industry would address this issue is unclear and should be the subject of further research.

Skills gaps and shortages are impeding the building industry's ability to deliver MDH. New Zealand is in the middle of a housing crisis. According to many of our interviewees, government intends to resolve this by providing a substantial increase in MDH typologies to the housing market under the KiwiBuild scheme. Unless the skills gaps and shortages described here are addressed, New Zealand runs the risk of being unable to deliver this housing or delivering poor-quality MDH that does not meet our needs.

8. Summary of findings

8.1 Literature review

Overall, there was a general lack of literature available regarding both the interest and ability of organisations within the building industry to deliver MDH and the skills gaps and shortages that may impede MDH delivery.

This is due predominantly to the fact that construction and labour forecasts do not categorise projections by building typology but rather by occupation and geographic region. Therefore, insights regarding MDH as a specific building typology are difficult to extract from the wider analysis for the entire building industry.

Notwithstanding the lack of relevant literature, the following key points were identified.

8.1.1 Interest and ability to deliver MDH

Current literature does not clearly identify who in the building industry has the interest and ability to deliver MDH. Nonetheless, larger organisations were considered more likely to have the interest and ability to deliver MDH than smaller, less well resourced firms. This is due to the experience, market knowledge and access to capital usually afforded to larger organisations (Page et al., 2018).

It would be beneficial to investigate whether the New Zealand building industry would be better to focus resources on increasing the interest and ability of larger organisations to deliver MDH, whether this effort would be better directed to scaling up smaller organisations or a combination of both.

Interest and ability to deliver MDH may also change over time. At a particular point in time, a number of organisations may be interested in delivering MDH if certain market conditions are in place (such as demand, labour availability, and financing).

Additional research into the opportunities and constraints associated with financing MDH projects would be useful. Making MDH more attractive as a development option would increase interest in MDH delivery.

The cyclical nature of the sector may discourage firms from taking on permanent employees and investing in their development (MBIE, 2013), thereby negatively impacting the ability of organisations to deliver MDH.

8.1.2 Industry skills gaps and shortages

Skills gaps and shortages in housing delivery are recognised as an issue across all levels of the building industry. However, there is very little information available on skills gaps or shortages specifically related to MDH delivery.

This absence of MDH-specific data could be addressed by reframing labour and construction projections to include breakdowns per building typology (including MDH).

A skills shortage of an estimated 15,000–17,000 trade qualified workers with a level 4 or better qualification by 2022 is anticipated (Bohling, 2017). Although no literature specifically addresses the MDH skills shortage, this may be even higher given the growth of MDH to an anticipated 35% of new homes by 2025 (Page, 2017).

The 2017 MBIE Future Demand for Construction Workers report (MBIE, 2017a) identified occupations expected to experience the largest growth to 2022 across New Zealand. These included plumbers (with an expected increase of 15%), electricians (increase of 14%), and civil engineering professionals (increase of 12%).

Further research regarding skills gaps and shortages in MDH-related construction occupations and qualifications would be useful to provide more clarity on specific skills gaps and shortages for each occupation. It may also assist in the development of training programmes or immigration policies to increase the number of appropriately skilled workers able to deliver MDH.

8.2 Interviews

8.2.1 Methodology

105 members of the building industry who had an interest in MDH were interviewed by telephone about the industry's interest and ability to deliver MDH and MDH skills gaps. Interviews were recorded and transcribed and then analysed using thematic analysis.

8.2.2 Interview findings

Interest and ability to deliver MDH

18 major themes emerged from the data set for interest and ability. The five most dominant themes are discussed in more detail in this report. The first was that the delivery of MDH is dependent on access to finance and that the current systems around gaining finance are a barrier for builders and developers taking on MDH projects. A related theme that ran throughout the interviews was that the government should be responsible for resolving the issues that prevent MDH delivery. This was often suggested by participants when discussing the financial barriers to delivering MDH, including managing risk. Some participants said that the government should be involved throughout the construction process to support the building industry to deliver good-quality MDH.

The quality of the MDH built will affect community acceptance of these typologies. This was highlighted by participants as an important factor that impacts the building industry's interest in delivering. They said that communities will need to accept MDH and give the industry confidence that there is a demand for these typologies for it to be a success. Poor-quality MDH delivered now runs the risk of making New Zealanders less attracted to these types of homes in the future.

The cost of long and complex consenting processes was another theme that emerged as a deterrent to MDH delivery. Participants expressed frustration with the RMA and building consenting processes, explaining that the costs and time associated with these made MDH unviable for smaller less-experienced building companies. Resolving this issue would go some way to addressing some of the other issues around finance and profit margins for MDH.

The drive for profit made MDH a less-favourable option for builders and developers with established businesses preferring to deliver stand-alone houses. Participants said that stand-alone houses presented less risk to the builder or developer. There is an established demand for these homes, and the building and consenting processes are less arduous. All these factors make stand-alone homes a more attractive option in a profit-driven industry. For MDH to be as attractive, profit margins will need to be assured and competitive with stand-alone housing. Resolving issues around risk,

finance, consenting and community acceptance will all contribute to increasing the profitability of MDH and making it a more attractive option for builders and developers.

Skills gaps and shortages

22 major themes emerged from the data set regarding skills gaps and shortages in the building industry for MDH. Around half of those related to specific sectors of the building industry where skills gaps and shortages were a problem.

According to participants, skills gaps existed around technical MDH knowledge, which includes fire spread, acoustics, façades and liveability.

There are skills gaps and shortages around MDH design. These skills deficits are within the design sector and in other trades where interpreting and building to MDH designs can be a problem. Participants said there were skills gaps and shortages in the building trade, and plumbers and bricklayers were also in short supply. There is a skills gap around prefabrication, automation and innovation and in engineering. New technologies and building approaches would be one way to address skills shortages in other areas, so this skills gap is critical.

Project management of MDH requires a specific skill set, and participants said there was a gap in this sector also.

There were skills gaps described around the regulatory systems in New Zealand where people failed to have the knowledge required of the RMA and building consenting process. This skills gap was reported as existing within both BCAs and the building industry. Participants said there were skills shortages for building consent officials. The shortage of building consent officials was described as being a major factor contributing to the long time and high cost involved in gaining resource and building consents.

Developers were described as not always having all the skills required to deliver MDH, and there was a skills gap around financing MDH developments as well.

As well as identifying specific industry sectors affected by skills gaps and shortages, six overarching themes are also described. These themes provide context around the reasons for skills deficits and possible solutions.

The first is that there is an industry-wide skills shortage around MDH, meaning there simply are not enough skilled workers in the workforce to deliver this housing. In addition to the shortage of skilled workers, participants said there was an industry-wide skills gap. The workforce does not have all the skills required to deliver the MDH New Zealand needs.

Participants suggested that the building industry needs upskilling in MDH. One approach to this would be ongoing training and qualifications in MDH for those already in the workforce. In addition, participants said that MDH should be covered during apprentice training, ensuring new trade professionals are entering the workforce ready to deliver MDH. Another theme related to training was that trades are seen as an undervalued career path. Trade training is perceived to be a second-best option after university and is not attracting the best-quality candidates into apprenticeships. The benefits of trade careers need to be better communicated to young people making career choices in order to ensure the quality of the building workforce.

The quality of the MDH being built is affected by the skills gaps and shortages identified in this study. Skills deficits are described by participants as costing time, quality and money. The long-term cost of delivering poor-quality MDH is that consumer demand is undermined as its reputation suffers and MDH becomes an increasingly unviable building typology in the New Zealand market.

9. Conclusions and recommendations

9.1 Conclusions

If we are to increase the New Zealand building industry's interest and ability to deliver MDH, it will be imperative that the skills gaps and shortages identified by interviewees as described in this report are addressed. Calls for government intervention to better facilitate the financing and delivery of MDH have been heeded. The announcement of KiwiBuild signals the beginning of an era of MDH development on a scale New Zealand has never seen before. However, if good-quality MDH is to be delivered as part of the roll-out of KiwiBuild, several issues will need to be tackled. The impacts of the themes discussed in this report and some recommendations are presented in this section.

The skills gaps and shortages around resource and building consenting are adding time and expense to the process, which prevent smaller industry members from being interested in or able to deliver MDH. BCAs will need to be better resourced to more efficiently process consent applications and reduce the costs to developers and builders associated with this process. Significant investment should be made into BCAs to ensure adequate staffing and that building consent officials have the knowledge to consent MDH typologies. Those BCAs affected by KiwiBuild should be prioritised for this skill development.

Designers, developers and builders will also need to be upskilled around New Zealand's building regulations to ensure MDH consent applications provide all the information necessary to approve the application and speed up the process. The development of Acceptable Solutions for MDH typologies in the Building Code would likely go some way to addressing issues around building consents. Additionally, the results of this study highlight the need for guidance for the building industry around the RMA and gaining resource consent. If such guidance exists, the building industry does not appear to be aware of it. Government needs to take a more active role in providing training to the building industry on resource consenting if it is to encourage builders and developers to take on MDH projects.

Reducing the time and cost of gaining consent should improve profit margins for MDH. The drive for profit is a disincentive for builders and developers to transition from traditional stand-alone houses to MDH typologies. Stand-alone houses present less risk and offer more assured profits. Furthermore, builders and developers with no experience of MDH may not have the skills needed to scale up to MDH. Encouraging this shift will require upskilling the industry in MDH specifically around finance, project management and consenting, while providing opportunities to realise profit margins equal to or exceeding traditional stand-alone houses. Successful public/private partnerships like Hobsonville Point provide a template for future developments that could encourage more builders and developers to move towards MDH delivery. KiwiBuild aims to offer more of these opportunities and should facilitate greater interest and ability to deliver MDH over the next decade. The systems and policies put in place to support KiwiBuild will need to be set up with the longer-term objective of supporting the industry to continue to deliver these typologies under its own steam. KiwiBuild is a great initiative to address housing need in the medium term, and it should set up New Zealand's building industry to continue to deliver the housing we need beyond 2028.

Providing training to apprentices in MDH now will futureproof the building industry and ensure builders new to the workforce are not solely relying on on-the-job experience to gain skills in MDH. If tradespeople enter the workforce with a basic understanding of best practice for MDH, they will be more versatile and valuable to the industry. More importantly, the quality of the MDH being built should improve. In addition, the building industry must work to promote the benefits of trades training and careers to attract high-performing young people as they move from secondary school into tertiary education. The building industry will need to change the perception that trade careers are a second-best option for less-academic students. To achieve this, secondary school teachers and careers advisors will need to be educated about the levels of success and achievement possible when following a trade-based career path. Trade career pathways will need to be more clearly defined and well communicated to young people and those guiding their early career decisions. Attracting more people into trade careers will also help to address the skills shortages currently hindering MDH delivery.

As the New Zealand building industry becomes more skilful in MDH delivery and good-quality MDH is built, it will be easier for New Zealanders to see the benefits of living in these types of dwellings. If medium-density homes and neighbourhoods are built with well considered infrastructure and access to amenity, demand for these homes should increase. Easing the building industry's nervousness around whether New Zealanders want to live in MDH will encourage them to deliver more of these typologies and reassure developers and builders that there are profits to made. On the other hand, there are ramifications of delivering poor-quality MDH homes and neighbourhoods. The market could become averse to MDH, and these typologies could become stigmatised as undesirable neighbourhoods if they do not provide the lifestyles New Zealanders want. The importance of getting MDH right cannot be overstated.

In summary, until the New Zealand building industry resolves the skills gaps and shortages that exist around MDH, it will be difficult to increase its interest and ability to deliver these typologies. The industry representatives who took part in this study called on the government to help address some of the barriers to delivery. Since then, the government has announced the KiwiBuild scheme. This goes some way to addressing issues around finance, risk and profit. However, while skills gaps and shortages in the building industry persist, the delivery of MDH cannot be assured. Improving training in MDH for apprentices, the existing workforce and BCAs will speed up the delivery of MDH.

The next 10 years is an opportunity for the New Zealand building industry to hone its skills in MDH with the support of the government. This will enable it to continue to deliver the variety of housing typologies a growing New Zealand population needs beyond KiwiBuild.

9.2 Recommendations

This research has analysed the information and viewpoints participants have provided via interviews. From this, we have drawn a set of recommendations. These are not just participants' recommendations. They are researcher recommendations based on the participants' descriptions of the issues, as participants did not necessarily suggest all of these ideas specifically.

The findings from this qualitative research would benefit from industry validation. The ideas described in this study report should be actively shared and discussed with the MDH building industry to ensure the findings from this sample of interviewees can be

generalised to the wider building industry. A formal validation process involving workshops or focus groups with industry around the themes and recommendations presented in this study report would help clarify and prioritise next steps for work to address the industry's interest in and ability to deliver MDH and skills gaps.

The interviewees have provided clear messages regarding what they think about industry interest in and ability to deliver MDH. They have also stated what they think about the current state in terms of skills – both gaps and shortages.

Some also made suggestions for how things might be improved, and their descriptions of the issues the industry is grappling with guided further recommendations. They are summarised here.

It is recommended that government increases investment in resourcing BCAs so they have enough building consent officials to process consent applications in a timely manner and at less cost. This should include upskilling of all new and existing building consent officials in MDH typologies. Priority for this investment should be in those BCAs affected by KiwiBuild. Participants recommended that upskilling the existing building industry workforce on the resource and building consent processes for MDH would make a significant difference to the industry's ability and interested in building MDH. Ensuring industry provided BCAs with all the information they require to consent a project would have immediate and significant impact. The development of guidelines for industry on our building regulations and a proactive government-led training initiative that teaches designers, developers and builders how to engage effectively in the consenting processes would be important and useful first steps. In addition, Acceptable Solutions for MDH should be developed as part of the New Zealand Building Code to facilitate easier consenting.

There was a clear message that the existing building workforce should be upskilled in MDH. Ongoing training should be provided that covers the technical aspects of MDH design and building including fire protection, acoustics, façades and liveability. Further, training should be provided around financing and project managing MDH development and building, as these are areas where MDH requires distinct skill sets.

It was felt that replication of successful public/private partnerships like Hobsonville Point, whether part of the KiwiBuild scheme or otherwise, would be impactful. Now that we have KiwiBuild in place, systems and policies established to facilitate KiwiBuild should be set up with a longer-term objective of providing a structure for the New Zealand building industry to continue to deliver the diverse house typologies needed beyond 2028.

A specific recommendation was made that building practices for MDH should be covered in apprenticeship training. In addition, an education programme aimed at secondary school teachers, careers advisors and young people making career decisions should be developed. It should highlight the benefits of a trade career with a view to repositioning trade training as equal to university studies and attracting more academic students into the trades. This will also require the building industry to clarify the career pathways offered by trades.

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Appendix A: Themes identified for interest and ability to deliver MDH

Table 5 shows the major themes and subthemes, the number of participants who contributed to each theme and the number of mentions or examples of the theme across the entire data set.

Table 5. Themes related to interest and ability to deliver MDH.

Major theme	Description	Subthemes
Company size matters – bigger is better Participants: 55 Mentions: 117	The delivery of MDH requires medium to large-sized companies. Small building companies do not have the resource/capacity to take on MDH.	• Resources • Manpower • Capacity • Fletchers • Large firm monopolies • Overseas companies to deliver MDH • Issues with residential builders scaling up to MDH • Housing NZ/government • Delivery of volume • Government tendering favours big firms • NGOs to deliver MDH – e.g. NZ Housing Foundation
Finance fundamental to delivery Participants: 78 Mentions: 222	Companies need access to significant finance to deliver MDH.	• Resources • Company size • Need finance skills • Financial innovation • Security of contract • Delivery of volume • Housing NZ/government • Land procurement • Financial systems barrier to delivery • Alternative development approaches – e.g. co-housing • MDH is expensive to build • MDH is less profitable • MDH as high risk to developer/builder • Construction costs barrier

Major theme	Description	Subthemes
Experience of MDH important Participants: 43 Mentions: 72	Prior experience delivering MDH valuable for future delivery and vice versa – lack of experience is a barrier to MDH delivery.	• Industry is learning MDH • Government is experienced in MDH • MDH new typology – lack of experience • Experienced builders to deliver MDH
MDH-specific skills and knowledge required for delivery Participants: 55 Mentions: 133	MDH requires different skills and knowledge than traditional stand-alone houses. This is not about skills shortages/gaps, this is about technical knowledge required for MDH. This theme is closely related to the themes of 'MDH is challenging to deliver' and 'Skilled professionals required to deliver MDH'. These themes overlap. However, there are important distinctions in the subthemes that mean it is useful to understand them as separate issues.	• Consenting knowledge • Building code knowledge • Skills beyond NZS 3604 • Collaboration – designer, developer, builder • Skills across entire delivery pipeline required • MDH-specific skills – fire, acoustics, construction • Understanding of MDH demand
Regulations as barrier to delivery Participants: 71 Mentions: 157	Any mention of any regulatory system and how it impacts delivery of MDH, including the Building Code, consenting process, RMA.	• Regulations stifle good design • Planners and regulators are inflexible • Subdivision process problematic • Regulations are a barrier to innovation • The Building Code is bad • BCAs are a barrier to delivery • Consenting process is a roadblock to delivery • Extend NZS 3604 for MDH • Changing regulations could facilitate MDH delivery • Regulations should enforce design quality
Skills gaps/shortages barrier to delivery Participants: 41 Mentions: 80	There are not enough professionals with the right skills in the industry to deliver the MDH we need.	• Skills shortage barrier to MDH • Industry is learning MDH • Skills beyond NZS 3604 needed • Need to upskill the New Zealand sector • Industry does not know how to deliver MDH • Whole of industry is stretched • Skills across entire delivery pipeline required for MDH • Ongoing training for LBPs

Major theme	Description	Subthemes
		• MDH-specific skills required – fire, acoustics, façade, construction • MDH challenging compared to stand-alone • Engineering of MDH more complicated • Development skills key to MDH delivery
Government to support delivery of MDH Participants: 61 Mentions: 139	The government is best positioned to deliver the MDH we need. This includes Housing New Zealand, central government and local government.	• Government should deliver • Government intervention needed for MDH delivery (through legislation or as developer) • Public/private collaboration to deliver MDH • Public/private sector tensions over responsibility for MDH delivery • Government can do whole pipeline – finance, design, develop, build • Private sector not innovative – risk averse • Government as innovator • Councils should deliver MDH • Government is experienced • Government provides quality housing • Government is NOT equipped to deliver MDH • Government is responsible for solving housing problem
Drive for profit disincentivises MDH delivery Participants: 66 Mentions: 163	The drive to maximise profits is a disincentive to deliver MDH, i.e. other building typologies may be lower risk with greater profit margins.	• Affordability • Incentives needed • Boom/bust cycle barrier • Long-term security of contract needed • Business failures deter investment from industry • Financial systems barrier to delivery • Consumer demand driving delivery • MDH is expensive to build • MDH is less profitable • Stand-alone houses low risk • MDH high risk to developer/builder • Construction costs barrier

Major theme	Description	Subthemes
Affordable MDH must be delivered Participants: 47 Mentions: 113	The MDH that is built must be affordable to New Zealanders.	• Affordability • Deliver for diverse communities • Deliver community-specific solutions • Alternative development approaches – co-housing, community-driven development • NGOs to deliver MDH – NZ Housing Foundation • MDH as social housing • Standardised designs would help delivery • Social housing providers to deliver MDH • Construction costs barrier • Responsible developers/development
Skilled professionals required to deliver MDH Participants: 55 Mentions: 103	MDH delivery requires skills specific to MDH across multiple professions.	• Skilled developers • Skilled designers • MDH-specific skills – fire, acoustics, façade, construction • Consenting knowledge • Skill and knowledge of MDH • Prefabrication • Collaborative skills – designer, developer, builder • Skilled project managers • Skilled engineers • Skilled builders • Qualified
Prefabrication and innovation required to deliver MDH Participants: 31 Mentions:61	Prefabrication and other new technology will assist in delivering the MDH we need.	• Prefabrication • Innovation • Deliver volume • Regulations barrier to innovation • New Zealand industry slow to innovate • Automation
Public and private parties to contribute to delivery Participants: 47 Mentions: 93	This theme focuses on the need for partnership between public (central and local government) and private industry to deliver the MDH we need.	• Invest in New Zealand industry • Public/private contributions/collaborations • Public/private tensions over responsibility for MDH delivery

Major theme	Description	Subthemes
Community acceptance of MDH required for delivery Participants: 66 Mentions: 173	New Zealand communities will need to accept MDH if it is to be delivered.	• Community acceptance (lack of) is a barrier to MDH delivery • Deliver community-specific solutions • Must deliver liveable MDH • Need understanding of demand/housing preferences • Consumer demand driving delivery
International learnings to help delivery Participants: 42 Mentions: 82	The New Zealand industry can learn from successful overseas examples of MDH.	• International learnings • Overseas examples • International comparisons – New Zealand inferior
MDH as challenging to deliver Participants: 55 Mentions: 105	Compared to other building typologies, MDH is technically challenging to deliver.	• Delivery of MDH is complex • Industry learning MDH • Subdivision process is problematic • Financial systems barrier • MDH challenging compared to stand-alone houses • Engineering of MDH more complicated • Extend NZS 3604 to MDH • Issues with residential builders scaling up to MDH
Hobsonville Point as an example of good delivery of MDH Participants: 14 Mentions: 21	Any mention of Hobsonville Point as an example of MDH being delivered well.	• Hobsonville Point as example of good delivery of MDH
Must deliver quality MDH Participants: 58 Mentions: 145	Those delivering MDH must be able to deliver quality buildings.	• Quality • Must deliver liveable MDH
New Zealand industry must deliver MDH Participants: 13 Mentions: 20	This theme focuses on the importance of investing in New Zealand industry rather than bringing in international organisations to do the work.	• Invest in New Zealand industry • Upskill New Zealand sector • Don't outsource overseas • Whole of industry is stretched • Industry learning MDH • Overseas companies to deliver MDH (counter code) • Foreign labour negative for industry • Change regulations to facilitate delivery

Appendix B: Themes identified for MDH skills gaps and shortages

Tables 6 and 7 show the major themes and subthemes, the number of participants who contributed to each theme and the number of mentions or examples of the theme across the entire data set.

Table 6. Skills gaps – specific building industry sectors affected.

Major theme	Description	Subthemes
Design skills gap Participants: 29 Mentions: 44	The designers we have in the industry do not have all the skills required to design the MDH we need.	• Design skills gap • Poor MDH design = slums of the future • No skills gap/shortage in design
Developer skills gap Participants: 6 Mentions: 9	The developers in the industry do not have all the skills required to deliver the MDH we need.	• Developer skills gap • Developers learning by experience • Need developer training/qualification
Regulatory skills gap Participants: 17 Mentions: 22	There is a lack of knowledge in the industry regarding the Building Code, consenting and the RMA for MDH.	• Consenting skills gap • BCA skills gap • Regulatory knowledge gap • Building Code knowledge gap • Legislator skills gap
MDH technical skills gap Participants: 43 Mentions: 62	There are skills specific to MDH that are lacking in the industry. These include skills around fire, acoustics, façades, liveability.	• Liveability skills gaps • Fire protection skills gaps • Acoustics skills gaps • Façade skills gaps • Technical skills gaps • Low-maintenance design skills gap • Prefabrication skills gap
Finance skills gap Participants: 4 Mentions: 5	There is a knowledge gap around the financing of MDH.	• Finance skills gap • Procurement skills gap
Builder skills gap Participants: 28 Mentions: 34	Builders in the industry do not have all the skills required to deliver the MDH we need.	• Builder skills gap

Major theme	Description	Subthemes
Prefabrication/automation/innovation skills gap Participants: 25 Mentions: 38	The industry does not have all the skills required to fully utilise prefabrication/automation/innovation in the delivery of MDH.	• Prefabrication skills gap • Automation skills gap • Lack of innovation skills • Prefabrication mitigates skills gaps/shortages
Project management skills gap Participants: 22 Mentions: 35	Project managers in the industry do not have all the skills required to deliver the MDH we need.	• Project management skills gap
Builder skills shortage Participants: 27 Mentions: 34	We do not have enough skilled builders/contractors do deliver the MDH we need.	• Builder skills shortage • Qualified builder shortage
Engineer skills shortage Participants: 6 Mentions: 7	We do not have enough skilled engineers to deliver the MDH we need.	• Engineer skills shortage
BCA skills shortage Participants: 5 Mentions: 6	BCAs do not have enough skilled building officials to consent the MDH we need.	• BCA skills shortage

Table 7. Skills gaps – overarching themes around skills deficits.

Major theme	Description	Subthemes
MDH skills shortage Participants: 98 Mentions: 186	There are not enough skilled workers to deliver the MDH we need. General statements about the state of the whole industry.	• Skills shortage • Skills shortage industry-wide • Industry under pressure is an unpleasant workplace leading to high turnover • Tradespeople skills shortage • MDH skills shortage • Need to retain skilled workers • No skills shortage
MDH skills gap Participants: 73 Mentions: 114	General statements that the workers we have in the industry do not have all the skills they need to deliver MDH.	• Industry learning MDH • Upskilling of entire industry needed • Industry-wide skills gap • Skills across building pipeline needed • Industry lacks MDH experience

Major theme	Description	Subthemes
		• Skills gaps affecting quality
Experience in MDH important for skill development Participants: 32 Mentions: 50	MDH skills develop with experience in these typologies.	• Industry lacks MDH experience • Industry learning MDH • Practical experience of MDH develops skills • Need experience of entire process of MDH build
Immigrant labour to address skills shortages Participants: 27 Mentions: 35	Immigrant labour as a solution to skills shortages in the industry. Also, immigrant labour as problematic to industry.	• Immigrant labour unfamiliar with New Zealand regulations • Immigrant labour required to deliver MDH • Immigrant workforce skilled • Immigration reform will affect skill supply (negatively) • Immigrant labour can have language skills gap • Immigrant labour to fill skills shortage • Building industry needs to accept multiculturalism
Boom/bust cycle is detrimental to skill development/retention Participants: 23 Mentions: 34	Skills that are built up through boom times are lost during the bust. Also, the boom/bust nature of the building industry makes it a risky career choice, putting some people off working in the industry.	• Boom/bust cycle erodes skills base • Boom/bust cycle makes building industry unsafe career choice
New Zealand building industry is 'learning' MDH Participants: 21 Mentions: 35	MDH is new to the New Zealand building industry, and we are learning it as we go.	• Industry is learning MDH
Geographical skills shortage Participants: 26 Mentions: 37	There are particular regions that have greater demand for MDH skills and cannot get enough skilled people to join the workforce to deliver the MDH we need.	• Geographical skills shortages
Trades are an undervalued career path Participants: 33 Mentions: 60	Trades are considered a second-best career choice for less-academic students, and this has impacts on who takes up apprenticeships and the quality of the building workforce.	• High apprentice turnover • Trades undervalued tertiary training option • Need to encourage tertiary training pathways • More apprenticeships
MDH is not adequately covered in training programmes Participants: 37 Mentions: 57	Tertiary training for building industry careers does not cover MDH well enough for the industry to have the skills required to deliver the MDH we need.	• Train apprentices in MDH • Training programmes are of mixed quality • Training programmes already at capacity • Practical MDH training required

Major theme	Description	Subthemes
Upskilling of existing workforce required Participants: 62 Mentions: 117	The existing workforce needs additional training in MDH in order to deliver the MDH we need.	• Upskilling of entire industry needed • Employers need to invest in skill development of staff • Upskill lower-level labourers • Ongoing training for LBPs in MDH • 'Old school' tradespeople need upskilling • Address the unqualified but experienced sector of the industry • Practical training required • Qualified = competent
Skills gaps/shortages affecting the quality/delivery of MDH Participants: 45 Mentions: 78	This theme is mostly examples of when a skills deficit has resulted in a poor outcome for MDH. It also includes general statements about the impact of skills deficits on the delivery of MDH.	• Skills gaps affecting quality • Unskilled workers cost time, money, quality • Skills gaps lead to serious consequences – e.g. fire spread

Appendix C: Email to invite participation

Invitation email for MDH Skills and Interest study.

SUBJECT: Have your say on medium-density housing and the building industry in New Zealand?

Dear XXX,

BRANZ is leading a research study on medium-density housing in New Zealand.

We are looking for feedback from the building and construction industry on what skills are needed and who has the interest and ability to deliver medium-density housing in New Zealand.

Interested? There's an opportunity to participate in a 30 minute telephone interview during September and October 2017.

Just send your name, email address, phone number and occupation to mdh@branz.co.nz and one of our researchers will be in touch with you.

You can choose a $50 voucher from either Mitre 10, Bunnings, Carters, ITM or Placemakers. It's our way of saying thanks for having your say in the interview.

Read more about the medium-density housing research programme.

Many thanks,

BRANZ MDH Research Team

Appendix D: Script for telephone interviews

Medium-density housing industry skills gaps and interest and ability to deliver MDH

Thank you for your interest in our study today. As you saw in the information letter, BRANZ has a medium-density housing research programme that aims to give the industry the tools to deliver medium-density housing that meets the needs of New Zealanders. This study is investigating who in the building industry has the interest and ability to deliver medium density housing (MDH) in New Zealand and where the skills gaps are that might impede delivery of MDH. This interview covers questions about both of these issues

Definitions

At BRANZ, we define MDH as 'multi-unit dwellings up to 6 storeys'. This includes a variety of typologies ranging from duplexes, terraced housing, low-rise apartments and apartments up to 6 storeys. Please keep this definition in mind.

For this interview, delivery means any stage in the process of bringing MDH to market – this includes designing, consenting, developing, constructing, Code compliance and sign-off or any other part of the process.

Interview questions

1. What is your current role in the building industry?

2. Whereabouts in New Zealand are you based?

3. Some quick demographic questions:
   a. What's your ethnicity?
   b. What's your age?

4. What qualifications or training do you have?

5. What is your work experience with MDH?
   a. How long have you worked with MDH?
   b. What level of involvement have you had with MDH?
   c. Which typologies have you worked with?
   d. If you have no work experience with MDH, what is your interest in it?

6. Can you describe a good example of MDH that you're aware of in New Zealand that you weren't involved in?
   a. Why do you consider this a good example of MDH?

7. Can you describe a bad example of MDH that you're aware of in New Zealand that you weren't involved in?
   a. Why do you consider this a bad example of MDH?

8. We know that housing demand is outstripping supply and that the demand for MDH is increasing. Who do you think is best positioned to deliver MDH in New Zealand? Which organisations?

9. What makes these sorts of organisations the most appropriate?

10. What do you believe would enable others in the industry to grow their capability to deliver MDH?

11. Can you describe any roadblocks that you believe are preventing others in the industry from being involved in the delivery MDH?

12. Where do you think the major skills shortages are that affect the delivery of MDH in New Zealand?

13. Do you think there are enough workers in the industry to deliver the MDH we need?

14. Do the workers in the industry have the skills and training needed to deliver the MDH we need?

15. In an ideal world, how do you think the industry could be set up to deliver quality MDH?

Thank you for your thoughts today. We really appreciate you taking the time to share your ideas with us. The results of this study will be available on BRANZs website mid-2018.