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Rider Levett Bucknall (RLB) is a global leader in construction and property consultancy, with a legacy that spans over 240 years. With 4,500 dedicated professionals working across 34 countries, we are committed to delivering exceptional value and successful outcomes for our clients.

Our independence empowers us to focus on what truly matters: providing expert advice and management across the built environment. Whether it's cost management and quantity surveying or technical advisory services, our expertise ensures commercial certainty and optimised assets for projects worldwide.

At RLB, our work goes beyond managing projects - we drive value and innovation for improved outcomes. From world-renowned landmarks like the Sydney Opera House to the support of major infrastructure including Central Interceptor and the Downtown Infrastructure Development Plan, our contributions leave a lasting impact on communities and the planet. With a steadfast commitment to sustainability, we aim to inspire a better tomorrow through the work we do today.

We believe in delivering with excellence, fostering collaboration, and always striving to make a positive difference. This is how we build trust, deliver quality, and continue to set the standard in our industry.

### **AUTHORSHIP**

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## **KEY POINTS**

Infrastructure construction has ramped up in response to strong population growth. This, in turn, increased civil construction costs, which impacted on projects. However, inflation has declined since 2023, and with higher interest rates having their intended impact in dampening demand, cost pressures in the New Zealand economy are easing in 2024.



Activity indicators such as readymixed concrete production signal softer construction activity more broadly, which in turn is alleviating cost pressures. Softer demand has led to lower prices in civil construction materials. Similarly, steady global steel production has helped ease infrastructure construction cost pressures, which is positive for New Zealand's construction sector.

# BUILDING SECTOR FIRMS FEELING PESSIMISTIC ABOUT OUTLOOK

NZIER's Quarterly Survey of Business Opinion shows that the construction sector is still very downbeat regarding the economic outlook. This pessimism reflects continued weak construction demand, with building sector firms reporting a decline in output and new orders. This is weighing on pricing power and, in turn, profitability in the construction sector.

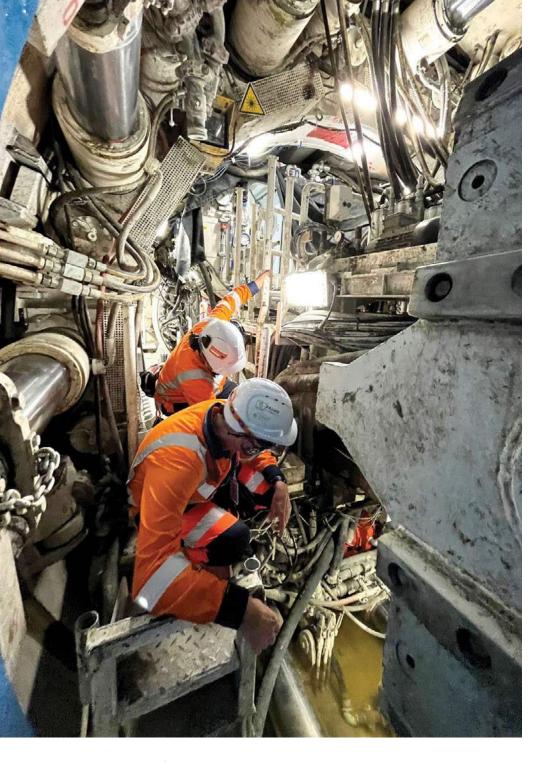


Despite these challenges, the infrastructure investment outlook presents a more positive narrative. Te Waihanga, the New Zealand Infrastructure Commission, reported in its Pipeline snapshot that infrastructure projects totalled \$121.2 billion in March 2024. Of this, around \$44 billion is estimated to be under construction and \$11 billion in procurement. Key sectors driving this investment pipeline include transport and water infrastructure. The Government announced in March its renewed plans for Roads of National Significance (RONS), and unveiled the September National Land Transport Programme which allocated nearly \$33bn for transport projects including the reintroduction of the RoNs, a focus on road maintenance, alongside further public transport initiatives.



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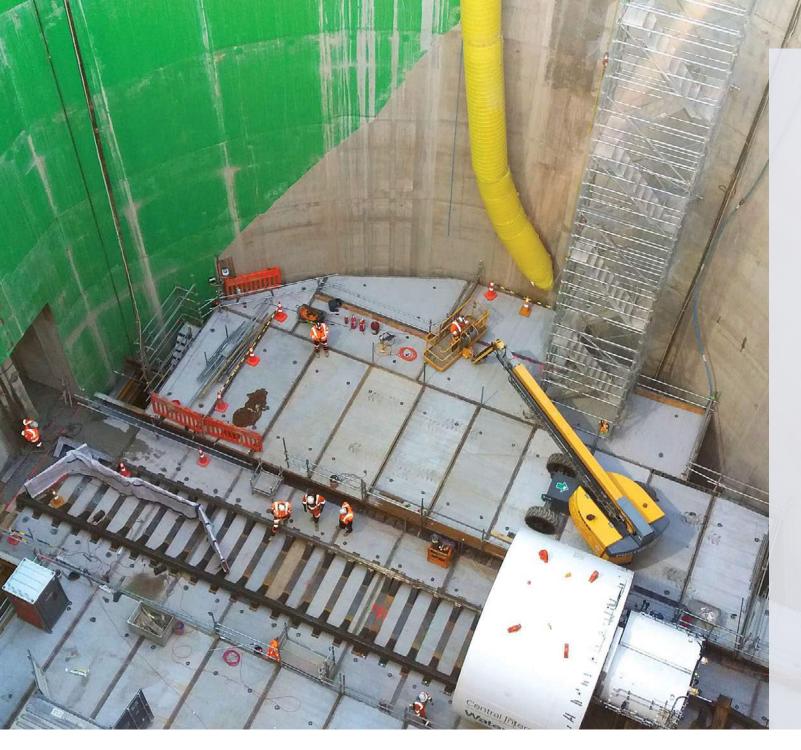
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# 1. INTRODUCTION

Welcome to the first edition of the Rider Levett Bucknall New Zealand trends in infrastructure construction, where we discuss the key developments in infrastructure construction. We also discuss what these recent developments indicate for the construction outlook ahead, including our forecasts for infrastructure construction cost inflation.

We assess the outlook for infrastructure construction costs based on the key drivers on the demand and supply side. On the demand side, this includes infrastructure investment, as well as the macroeconomic environment, which influences broader construction activity. On the supply side, the availability of labour and building materials are the key influences for the construction sector.



There has been a shift towards firms reporting the lack of demand as the primary constraint on their business, reflecting this weakening demand in the economy.

## 2. RECENT ECONOMIC DEVELOPMENTS AND TRENDS

The release of gross domestic product (GDP) data for March 2024 showed a small increase of 0.2 percent in economic activity over the quarter. On an annual basis, economic activity increased by 0.3 percent relative to year-ago levels. The pick-up in activity followed two consecutive quarters of decline. Overall, activity in the New Zealand economy remains subdued, particularly against the backdrop of the strong migration-led population growth over the past year.

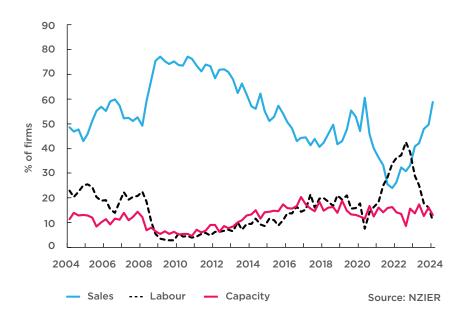
Capital investment contracted by 1.3 percent in the March quarter, reflecting caution amongst businesses given high interest rates and the uncertain demand outlook. Although private consumption increased 1.6 percent in the March quarter, the 1.3 percent growth over the past year represents a contraction in household spending on a per capita basis, given the strong population growth over this period.

There are clear signs that the impact of high interest rates in dampening demand is gaining traction. The most recent NZIER Quarterly Survey of Business Opinion (QSBO) shows an unwinding of the post-election rebound in business confidence and trading activity seen in late 2023 (see Figure 1). A net 28 percent of firms report reduced activity over the June quarter, while a net 35 percent of firms expect a deterioration in the general economic outlook.

There has been a shift towards firms reporting the lack of demand as the primary constraint on their business, reflecting this weakening demand in the economy.

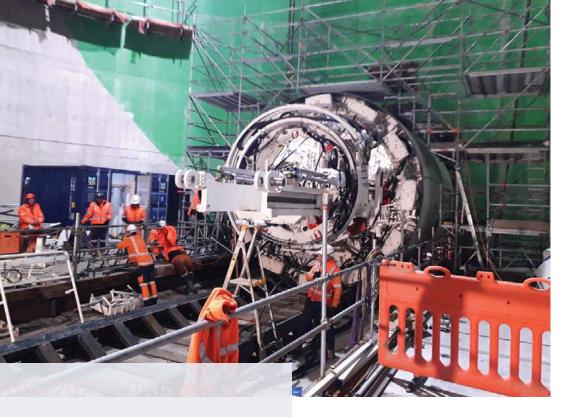
In the June quarter, a net 61 percent of firms reported a lack of sales as the primary constraint on their business, a substantial increase from the 42 percent who reported the same issue a year ago. Conversely, the proportion of firms citing labour shortages as the primary constraint dropped from 25 percent to 9 percent, significantly below the peak of 43 percent during the COVID-19 pandemic in September 2022. This reduction in labour shortages has eased capacity pressures across the New Zealand economy, including in the construction sector.

FIGURE 1 Economy wide: Factor constraints



The subdued sentiment reflects challenges faced by businesses, including uncertainty over the new Government's policies and spending plans, as well as the broader impact of higher interest rates. Consequently, weaker demand across sectors has prompted firms to scale back on staff numbers and investment plans. A quarter of firms reduced headcount in the June quarter, while a net 35 percent of firms plan to reduce investment in buildings, and a net 27 percent of firms plan to reduce investment in plant and machinery over the coming year.

Sentiment amongst households and businesses is weak in the current environment of higher interest rates and heightened uncertainty about Government priorities and public sector cutbacks. Households have cut back on discretionary spending in the face of increased mortgage repayments, with the weak demand, in turn, impacting businesses.



We expect currency movements will continue to be influenced by interest rate differentials. Given the earlier start to the easing cycle by the RBNZ, this is weighing on the New Zealand dollar. We expect a recovery in the NZD/USD once the Federal Reserve also embarks on its easing cycle.

### 2.1 INTEREST AND EXCHANGE RATES

The slowing in economic activity and weak sentiment amongst businesses and households have intensified speculation about whether the Reserve Bank of New Zealand (RBNZ) will reduce the official cash rate (OCR) by the end of this year. The subsequent release of June quarter Consumers Price Index (CPI) data showing a further easing in annual CPI inflation to 3.3 percent provided financial markets with more conviction of monetary policy easing by the RBNZ's November meeting.

The RBNZ cut the OCR by 25 basis points to bring it to 5.25% at the August Monetary Policy Statement. To the extent that markets had been divided about whether the OCR would be cut at this meeting, the move was a surprise. The central bank highlighted its concern at the easing in economic activity seen in the more recent high-frequency data and is now more comfortable that inflation will fall back to within its 1 to 3 percent target band. The RBNZ indicated further easing was likely, and we expect a followup OCR cut in the October meeting. How domestic inflation pressures evolve through non-tradable inflation will be a key influence on the trajectory of this easing cycle.

The focus on other central banks has also been on when they will cut interest rates. In particular, the US Federal Reserve's recent focus on the softening of the US labour market has intensified speculation that it cut interest rates soon. In his address to the Senate Banking Committee, Fed Chair Powell acknowledged that easing monetary policy "too late or too little could unduly weaken economic activity and employment". The comments supported expectations of a rate cut from the Fed in September this year.

We expect currency movements will continue to be influenced by interest rate differentials. Given the earlier start to the easing cycle by the RBNZ, this is weighing on the New Zealand dollar. We expect a recovery in the NZD/USD once the Federal Reserve also embarks on its easing cycle.

### 2.2 BUILDING INVESTMENT

The March GDP data showed a 0.5 percent increase in Other construction over the quarter, resulting in this type of construction being 3.2 percent higher on year-ago levels.

Other construction broadly encompasses construction associated with civil engineering, including major earth-moving, demolition, site clearance, and structures like bridges, pylons, and assets for oil and gas, but excludes building excavations and routine road resealing. The lumpy nature of infrastructure projects means that there can often be large changes in Other construction from one quarter to the next. We expect the strong migration-led population growth since the reopening of international borders in 2022 will drive stronger demand for Other construction over the coming years, particularly from the second half of 2025.

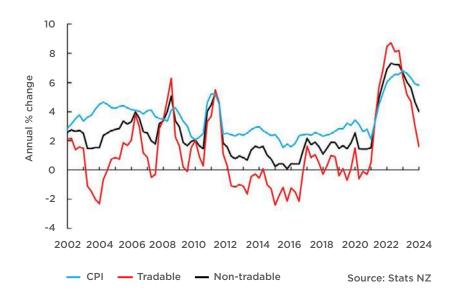
High inflation in 2022 and 2023 significantly impacted costs associated with civil construction. The rising inflationary pressures led to increased costs of materials and inputs used in construction activities. This inflationary trend translated into higher production costs for firms engaged in civil construction projects in the past few years.

However, the easing in capacity pressures in the construction sector and easing in general inflation pressures more broadly have driven a decline in civil construction cost inflation over the past year.

In the June quarter, CPI showed a further easing in annual inflation, reaching 3.3 percent. The result was largely driven by a decline in tradable inflation, with non-tradable inflation still elevated at 5.4 percent. Some services prices remain elevated, suggesting that some domestic inflation pressures persist in the New Zealand economy.

Nonetheless, the result, alongside other indicators such as core inflation and NZIER QSBO cost and pricing indicators, reinforced market expectations that the RBNZ will commence the easing cycle by the end of this year. We expect annual CPI inflation will ease back to within the RBNZ's 1 to 3 percent inflation target band by the end of this year.

### FIGURE 2 Inflation continues to ease

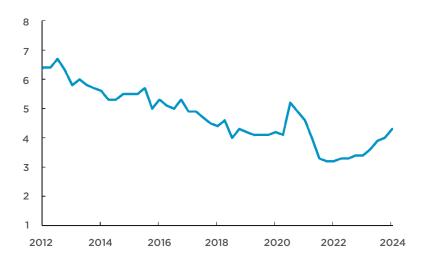


The impact of prior OCR increases in dampening demand in the New Zealand economy has become more apparent. Households and businesses are much more cautious about spending and investment in the face of higher interest rates, and firms are cutting back on staff numbers against this backdrop of weaker demand. Along with the cutbacks in the public sector, this is leading to a marked softening in the labour market.

Besides the decline in labour demand, there has also been an increase in the labour supply since the reopening of international borders in 2022. March quarter labour market data showed a lift in the unemployment rate to 4.3 percent, and we expect further increases in the unemployment rate to reach a peak of just under 6 percent in 2026.

<sup>1</sup> https://www.stats.govt.nz/assets/Uploads/Retirement-of-archive-website-project-files/Methods/Annual-national-accounts-sources-and-methods/Annual-national-accounts-

FIGURE 3 The unemployment rate has been increasing as the economy slows



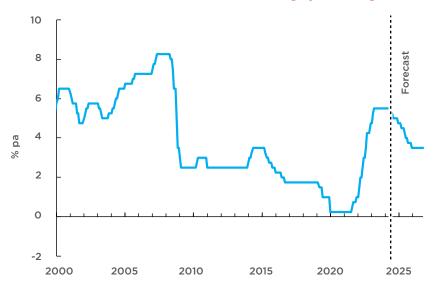
Source: Stats NZ

The RBNZ cut the OCR by 25 basis points to bring it to 5.25% at the August Monetary Policy Statement. The RBNZ highlighted its comfort that annual consumer price inflation is returning within its inflation target band and that inflation expectations and firms' price-setting behaviour were moving in the direction of low and stable inflation. Thus, the central bank has revised its OCR track projections lower, reflecting its view that the OCR needs to decline sooner than previously expected in the May MPS in order for inflation to settle at the 2% inflation target midpoint in the medium term. The RBNZ indicated further easing was likely, depending on inflation expectations and firms' price-setting behaviour continuing to move lower, consistent with annual CPI inflation being anchored at 2%.

### Global oil prices fluctuated due to COVID-19, now stabilising post-pandemic

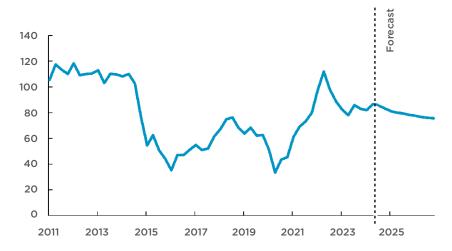
Crude oil is vital in infrastructure construction as it is refined into various products, such as bitumen, which is essential for paving roads and highways. Additionally, diesel fuel, derived from crude oil, powers construction machinery and transportation vehicles, facilitating the building of infrastructure projects. Moreover, crude oil-based products, like plastics and synthetic materials, are used in numerous construction components, making crude oil a cornerstone of modern infrastructure development.

FIGURE 4 The RBNZ commenced its easing cycle in August



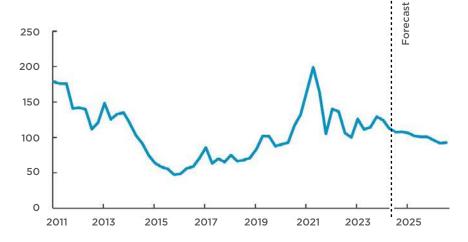
Source: RBNZ, NZIER forecast

FIGURE 5 The cost of crude oil is forecasted to stabilise



Source: Federal Reserve Bank of St Louis (FRED), Consensus Economics forecast

FIGURE 6 The cost of iron ore is forecasted to stabilise



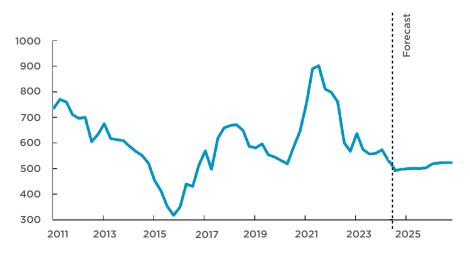
Source: Federal Reserve Bank of St Louis (FRED), Consensus Economics forecast

Since 2020, the global price of iron ore has exhibited significant volatility. From 2020, the price begins to rise sharply, culminating in a peak of around \$220 per unit in 2021, driven by heightened demand and supply chain disruptions during the COVID-19 pandemic. Following this peak, the price experienced a rapid decline but then fluctuated between \$80 and \$120 per unit through 2022 and 2023. The consensus forecast for iron ore indicates that global prices are expected to stabilise around \$100 per unit. This stabilisation is anticipated as markets adjust to a normal postpandemic and inflation begins to stabilise worldwide.

# Global steel prices stabilised with increased production

Steel prices have also stabilised globally due to increased production capacity and the stabilisation of the global iron ore supply chain. China's steel production increased at the beginning of 2024, which helped stabilise steel prices. This is likely to help ease cost pressures in infrastructure projects, which is positive for construction and development sectors in New Zealand (see Figure 7).

FIGURE 7 The cost of steel is also easing



Source: China Iron and Steel Association, Consensus Economics forecast

# Transport infrastructure inflation shows declines from the 2022 peak but faces potential inflation risks

Regarding transport-related infrastructure, Waka Kotahi NZ Transport Agency cost indexes track construction cost trends for specific infrastructure components, including maintenance, construction and bridges. From 2011 to 2017, the indexes remained relatively stable, with modest growth.

Since then, there has been a large degree of volatility in growth in these cost indexes. Capacity pressures in the construction sector drove a solid lift in costs from 2018, with a brief drop at the start of the COVID-19 pandemic. This decline was more than reversed in 2021 as increased infrastructure demand, supply chain disruptions, and labour shortages resulting from the COVID-19 pandemic drove another acceleration in costs.

Although the annual growth rates of these indexes decreased significantly from their 2022 peak, there has been a pick-up in the growth rates for these cost indexes more recently (see Figure 8).

The fluctuation in bitumen prices can significantly impact infrastructure construction costs, particularly in roading projects where bitumen is a key component. The bitumen price adjustment series, which tracks changes in bitumen prices over time, indicates a moderation in the rate of price decline. This adjustment is noteworthy for construction projects reliant on bitumen, suggesting a potential stabilisation in material costs (see Figure 9).

FIGURE 8 Waka Kotahi NZ Transport Agency cost indexes

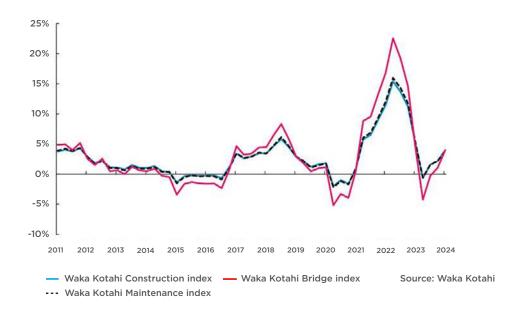
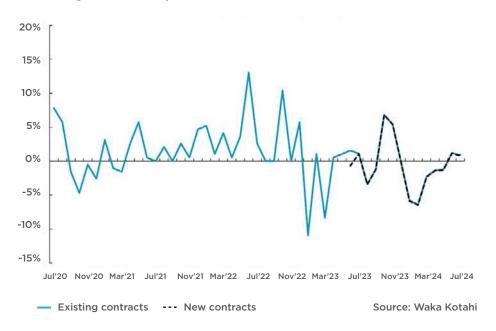


FIGURE 9 The bitumen price adjustment series suggests a decrease in the magnitude of the price decline



# Construction sector remains very downbeat

Other construction indicators continue to point to a subdued near-term pipeline of construction activity. The QSBO measure of activity in architects' own offices indicates ongoing weakness in the construction work pipeline. The weakness is broadbased across the different types of construction work, which is driving the easing in capacity pressures in the construction sector.

Weak construction demand is driving continued pessimism in the sector, with a net 65 percent of building sector firms expecting a deterioration in general economic conditions over the coming months. Firms also reported a continued decline in output and new orders in the June quarter.

FIGURE 10 Weak construction demand driving pessimism in the sector

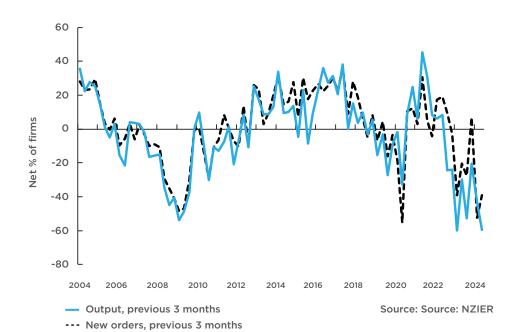


FIGURE 11 Sharp easing in pricing pressures

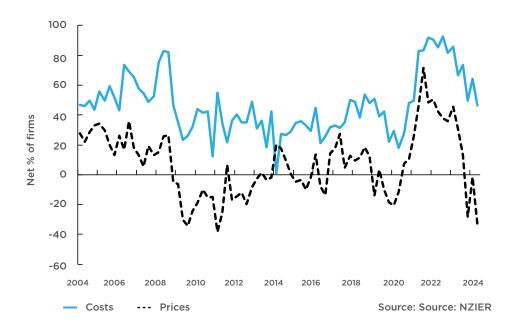
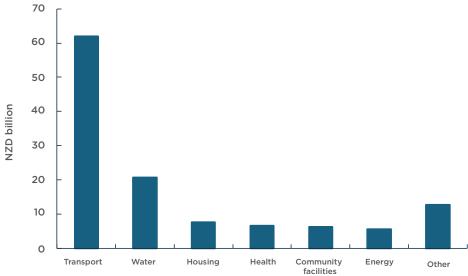




FIGURE 12 Transport and water infrastructure dominate the infrastructure pipeline<sup>3</sup>



Source: Te Waihanga, the New Zealand Infrastructure Commission

The Pipeline snapshot<sup>2</sup>
produced by Te Waihanga,
the New Zealand
Infrastructure Commission,
shows that infrastructure
projects totalled \$121.2 billion
in value for the March 2024
quarter. Of this, around
\$44 billion is estimated to
be under construction and
\$11 billion in procurement.

The \$12.7 billion increase in the value of infrastructure projects in the pipeline over the March quarter reflects a combination of new infrastructure projects (worth \$11.4 billion), increases in the value of existing projects, and new contributors to the pipeline. Transport infrastructure continues to be a dominant part of the projects planned, with the value of transport projects totalling \$61.9 billion. Meanwhile, the value of water infrastructure planned for the coming years totalled \$20.6 billion.

In terms of projected spend over the coming years, \$12.1 billion of infrastructure investment from the pipeline is expected to take place in 2024, while expectations for infrastructure investment for 2025 remain at \$11.6 billion. Over the near term, infrastructure investment in the transport, social, and community facilities and housing and water sectors is expected to dominate the infrastructure pipeline.

The Pipeline snapshot shows that transport and water infrastructure are driving infrastructure investment. Of the \$121.2 billion worth of infrastructure planned, \$61.9 billion of this is for transport infrastructure, while water infrastructure accounts for \$20.6 billion of this (see Figure 12).

Meanwhile, the Australia New Zealand Infrastructure Pipeline<sup>4</sup> produced by Infrastructure Partnerships Australia shows 13 projects in the pipeline, dominated by four projects in transport. The Partnership highlighted the Auckland Airport expansion, East West Link and Southern Links as key projects in this pipeline.

The Government announced in March its renewed plans for Roads of National Significance (RONS),<sup>5</sup> which contains projects comprising four-laned, grade-separated highways. Delivery of these projects has been confirmed under the recent 2024–27 National Land Transport Programme (NLTP).<sup>6</sup>

<sup>2</sup> https://tewaihanga.govt.nz/the-pipeline/pipeline-snapshot

<sup>&</sup>quot;Other" includes sectors such as Communications, Education and Waste

<sup>4</sup> Infrastructure pipeline by location - Infrastructure Pipeline

<sup>5</sup> https://www.nzta.govt.nz/planning-and-investment/roads-of-national-significance/

<sup>6</sup> https://www.nzta.govt.nz/planning-and-investment/national-land-transport-programme/2021-24-nltp/future-investment-2024-27-and-beyond/

# 4. METHODOLOGY

Rider Levett Bucknall commissioned NZIER to produce a framework for forecasting a measure that tracks infrastructure construction cost changes. While there is published information on construction costs relating to infrastructure construction from a variety of sources, including Waka Kotahi, what has been lacking is forecasts of infrastructure construction cost inflation.

Part of this reflects the large-scale and specific nature of infrastructure projects, which means that it is difficult to determine an index that is more broadly representative of cost changes in infrastructure construction. Another reason is the lack of forecasts of the inputs that go into composite indices that are compiled to capture past movements in various types of infrastructure construction costs.

We have developed a forecast for a representative index of infrastructure construction costs based on 1) the inputs we found to have a significant influence on infrastructure construction costs and 2) the availability of forecasts of these inputs themselves.

# 4.1.1 CAPITAL GOODS PRICE INDEX - CIVIL CONSTRUCTION

While recognising that infrastructure can span many different types of construction, we consider the Capital Goods Price Index - Civil construction sub-index (CGPI-Civil) the most appropriate measure to represent changes in infrastructure construction costs in New Zealand.

Stats NZ defines the CGPI as a measure which shows "changes in prices of new physical assets. For the construction industry, these physical assets include residential and non-residential buildings, and infrastructure-related construction such as roads and pipelines. It excludes the cost of ongoing maintenance and services."

The CGPI-Civil sub-index covers Transport ways, Systems for water and sewerage, Energy generation, transmission, and distribution works, Construction of telecommunications infrastructure, Other civil construction.

### **4.1.2 FORECASTING METHODOLOGY**

Based on our testing of empirical relationships of data, we determined the inputs which influence infrastructure construction costs. We require these inputs to have forecasts themselves so we can use them to form a forecast for CGPI-Civil. Based on these criteria, we developed a forecast model based on the trend and cyclical movements in the following variables.

We also note the source of the historical data and forecasts next to each series: Federal Reserve Economic Data (FRED), Reserve Bank of New Zealand (RBNZ), Stats NZ, NZIER Quarterly Predictions (QP) and Consensus Economics.

- New Zealand Labour Cost Index (Stats NZ; NZIER QP)
- New Zealand population (Stats NZ; NZIER QP)
- Commodity prices (FRED; Consensus Economics)
- NZD/USD (RBNZ; NZIER QP)
- New Zealand output gap (NZIER QP)
- New Zealand construction output gap (NZIER QP).

Our forecast model for civil construction costs reflects the influence of labour market conditions, demographics, commodity prices, the New Zealand dollar and the extent to which both construction and broader economic activity are tracking relative to capacity in the New Zealand economy.

For example, acute labour shortages have driven strong wage growth, which in turn puts strong upward pressure on construction costs in the construction sector.

More details on our forecasting model based on these inputs can be found in Appendix A.



Consequently, our model suggests that the CGPI-Civil Index will ease slightly by the end of the year.

The forecasted stabilisation in construction cost inflation is also evident in other indicators, such as the NZIER's QSBO. Building sector firms report a continued easing in labour shortages. In particular, unskilled labour is now easier to find. The drop in pricing indicators reported by firms in the NZIER QSBO points to further easing on construction cost inflation over the coming year.

We forecast annual civil construction cost inflation will ease to around 1.3 percent by the end of this year. Beyond that, we expect civil construction cost inflation to fluctuate around 1.5 to 2 percent over the medium term, as strong migration-led population growth underpins stronger demand for infrastructure construction later in the projection.

The Capital Goods Price Index - Civil construction sub-index (CGPI-Civil) (the Index) is an official measure of cost movements in the sector. The Index excludes GST, and we use the Index as an indicator of cost escalation.

The Index is a national average across all building types. We, therefore, advise caution when applying the increase in the CGPI-Civil as an indicator of cost escalation for specific projects.

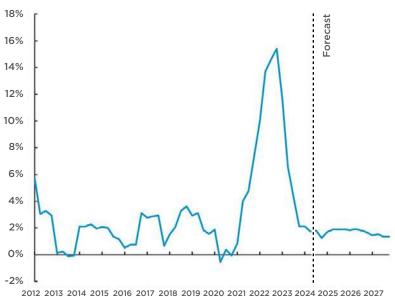
Civil construction cost inflation was robust in 2023 but eased on an annual basis more recently.

Overall, the developments reflect the easing in capacity pressures in the construction sector.

The 0.2 percent increase in civil construction costs in the 2024 June quarter saw annual civil construction cost inflation ease to 1.7 percent from the same quarter last year (see Figure 13 and Table 1).

We expect construction cost inflation will stabilise at lower levels over the coming years, reflecting ongoing relief from capacity pressures in the sector. Our CGPI-Civil Index forecasting model, which incorporates various inputs, indicates a continued easing of labour cost inflation. Moreover, consensus forecasts predict a near-term decrease in oil prices and a similar trend for commodity prices over the next few years.

### FIGURE 13 Civil construction building cost inflation



Source: Stats NZ, NZIER forecasts

**TABLE 1 CGPI-Civil construction cost index** 

Year	Quarter	Index	Quarterly % change	Annual % change
2019	Mar	818	-0.2%	2.9%
	Jun	829	1.2%	3.1%
	Sep	830	0.2%	1.8%
	Dec	833	0.4%	1.6%
2020	Mar	834	0.1%	1.9%
	Jun	824	-1.2%	-0.5%
	Sep	833	1.1%	0.4%
	Dec	833	-0.1%	-0.1%
2021	Mar	841	1.0%	0.8%
	Jun	857	1.9%	4.0%
	Sep	873	1.8%	4.8%
	Dec	894	2.5%	7.4%
2022	Mar	925	3.4%	10.0%
	Jun	975	5.4%	13.7%
	Sep	1000	2.6%	14.6%
	Dec	1032	3.2%	15.4%
2023	Mar	1033	0.1%	11.7%
	Jun	1039	0.6%	6.6%
	Sep	1043	0.4%	4.3%
	Dec	1054	1.1%	2.1%

Year	Quarter	Index	Quarterly % change	Annual % change
2024	Mar	1055	0.1%	2.1%
	Jun	1057	0.2%	1.7%
	Sep	1062	0.5%	1.8%
	Dec	1067	0.5%	1.3%
2025	Mar	1073	0.5%	1.7%
	Jun	1077	0.4%	1.9%
	Sep	1082	0.5%	1.9%
	Dec	1087	0.5%	1.9%
2026	Mar	1093	0.5%	1.8%
	Jun	1098	0.4%	1.9%
	Sep	1102	0.4%	1.8%
	Dec	1106	0.4%	1.7%
2027	Mar	1109	0.3%	1.5%
	Jun	1115	0.5%	1.5%
	Sep	1116	0.2%	1.3%
	Dec	1121	0.4%	1.4%

**Note:** The current and forecast CGPI-Civil is a national average, which does not differentiate between regions or sectors. We therefore advise caution in applying the increase in CGPI-Civil as a measure of cost escalation for specific projects.

Source: Statistics NZ, NZIER forecasts.

# Appendix A Forecast methodology

### **A.1 FORECAST INPUTS**

Our forecast model makes use of four inputs from NZIER's regular forecasts and forecast models:

- forecasts of the all-sectors, all salary and wage rates LCI, described below
- forecasts of GDP:
  - » short-term forecasts based on sector – and expenditure-specific cycles in economic activity
  - » long term forecasts based on labour force growth and trend historical multifactor productivity growth
- long-term trends in industryspecific GDP forecasts based on a descriptive (Vector Auto-Regression) model of trend shares of GDP by industry.
- exchange rate: NZD/USD.
- In addition, the forecasting method for the CGPI-Civil also makes use of:
- historical oil price and metals prices
- average consensus forecasts for commodity prices.
- The mid-point of consensus forecasts is used to forecast prices because these reflect a variety of different perspectives and forecast methods and consequently embody more information and betterformed expectations than the forecasts of a single forecaster.

### **LCI All industries**

The forecast of the LCI All Industries is used as input for our CGPI-Civil forecast; it is determined jointly with other key measures of macroeconomic activity. The forecasts are produced through an iterative process that considers both demand and supply aspects of the macroeconomy, institutional settings and economic shocks to global demand or local supply, such as droughts.

The forecast can be accurately described as having both a long-term trend component and a cyclical component. The trend component is forecast using the relationship between CPI inflation and overall wage inflation.

Cycles around the trend reflect fluctuations in the output gap (actual growth in output in the economy relative to growth in productive capacity). These fluctuations affect labour costs by affecting wage demands and the proportion of wage cost from overtime rates.

Forecast cycles also incorporate delayed effects of rising labour demand on unemployment and employment and, subsequently, wage inflation.

Growth in the LCI lags behind rising labour demand by 18 to 24 months.

### A.2 FORECASTING MODEL

The CGPI-Civil series is forecasted using an econometric model with two parts:

- A model of the long-term trend in the Civil Engineering Index as a function of all-sectors, all salary and wage rates LCI and population growth, oil price, and commodity prices
- A model of short-run and cyclical movements in the Civil Engineering Index as a function of changes in GDP and construction output gap and autoregressive terms.

Output gaps for GDP and construction and all other sectors forecast here are constructed from a (Hoddrick Prescott) filtered trend of industry activity around which cycles can be measured. These cycles dissipate over time, leaving our forecasts to be based on long-term trends.

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