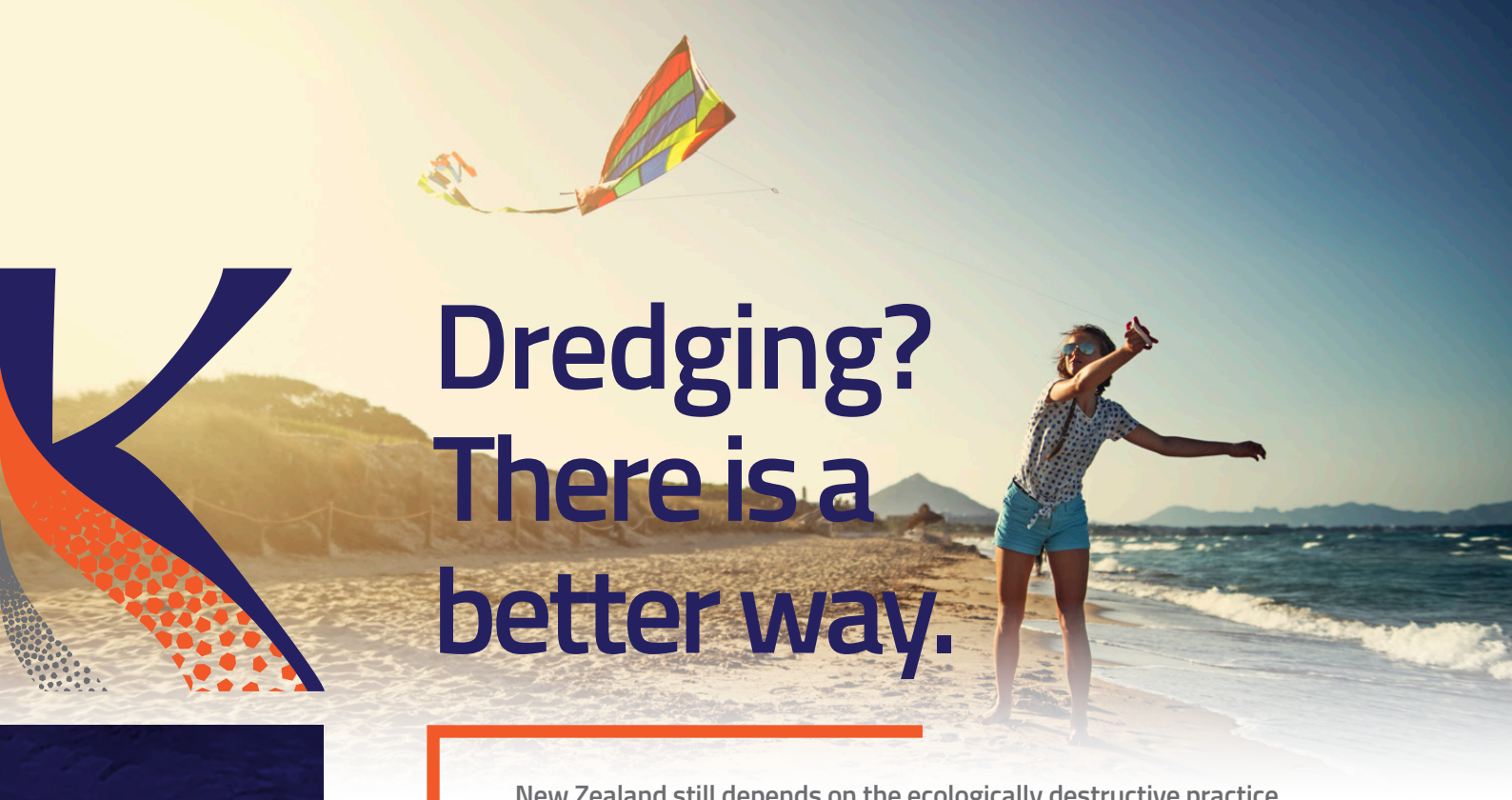


Dredging? There is a better way.

New Zealand still depends on the ecologically destructive practice of sand dredging for construction.

There is a better way to obtain concrete sand and Kayasand is committed to driving change for the long-term benefit of New Zealanders and our environment.

Is there a commercially viable, economical and sustainable alternative available?

Yes, manufactured sand. However, the biggest barriers to its widespread use are the prevalence of dredged natural sand, vested interest, resistance to change and a lack of government direction.

Granting long term consents for dredging might provide a ready supply of sand for construction but they also obscure the reality that most dredging for construction is unnecessary and acts as a disincentive to the construction industry to invest in more environmentally sustainable alternatives. It also contributes to coastal erosion, damages marine ecosystems, and affects our natural playgrounds.

Internationally, manufactured sand is already an accepted economical and commercially viable alternative for natural sand in construction. Good quality manufactured sand, like Kayasand's, is typically better quality than dredged sand and often costs no more. It uses aggregate sourced from land as well as the stockpiled waste, like crusher dust, and other by-products of quarrying. It could be made readily available.

As an example, our demonstration sand plant in Waikato — one of our smaller V7-40 plants — is capable of processing 100,000 tonnes p.a. depending on the quarry. The bigger V7 plant produces 150,000 to 600,000 tonnes p.a. or more. By comparison, natural sand sales to the Auckland construction market, as stated by McCallum Bros in their dredging consent applications, are a total of 720,000 tonnes p.a. 327,000 tonnes of this is supplied from Pākiri.

Dredged sand sold to the Auckland construction market	Tonnes p.a.	Manufactured sand plant production	Tonnes p.a
Pākiri			
McCallums in-shore and mid-shore	117,000	V7-120 x 3	900,000
McCallums/Kaipara Limited off-shore	210,000		
	327,000		**900,000**

Assuming dredged sand is blended with crusher dust at a 50 – 60% ratio, the total volume of crusher dust that needs to be processed into manufactured sand to supply Auckland's construction industry is 1.2–1.4m tonnes per year.

Just one of our medium-sized V7-120 plants produces about 300,000 tonnes per year and would be suitable for Brookby, Hunua and Drury quarries. Three V7-120s and three V7-60s can produce enough manufactured sand to replace all the concrete sand in Auckland at current concrete manufacturing rates. Our plan is to have 30 of these plants operating in Australia & NZ by 2030.

There are some limitations on the availability of crusher dust. However, this is the case with many different aggregate sizes. In fact, quarries are already looking to expand production, so more crusher dust will become available. With this increased production there can be more than enough Kayasand manufactured sand to supply the NZ construction industry.

If our environment is so important to us, why do we still allow dredging to occur, particularly when there is a viable, cost effective, proven solution available.

What's so good about Kayasand's manufactured sand?

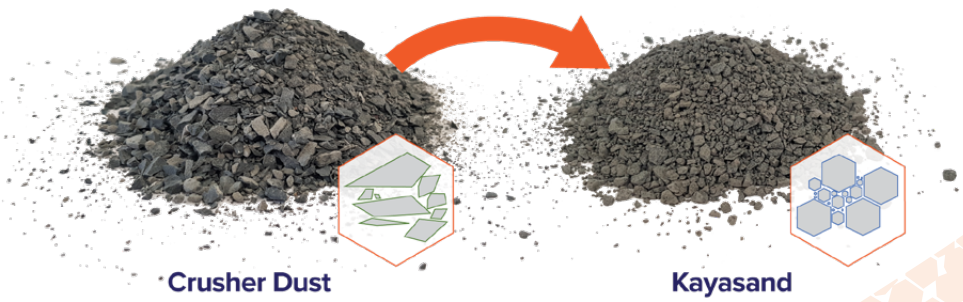
Sand made using our crushing and screening technology flows better, finishes better, binds better with cement, and has less voids than other manufactured sands.

Its cuboidal shape, precise grading and consistency is of such quality when compared with natural sand, it requires up to 20% less cement to create concrete of the same strength.

Our one step process produces sand that is precisely shaped and graded to desired specifications first and every time. There's no need to blend it afterwards.

Kayasand's manufacturing process provides superior results and contributes to the preservation of our precious natural resources for generations to come.

The secret is in the sand. **Kayasand.**



Is Kayasand technology proven?

The technology in our plants was developed 20 years ago because of a ban on dredging that severely disrupted concrete sand supply in Japan. Manufactured sand from V7 plants is now routinely used in Japan as the only sand in concrete. As a result, dredging in Japan has dropped from 40 million m^3 in 2000 to less than 7 million today.

China, which has also suffered huge environmental damage from dredging, now has over 240 of these V7 plants.

Australia has also started using the technology in NSW as growing restrictions on natural sand mining have encouraged industry to look at, and adopt, alternatives.

Would Kayasand plants make a prudent financial and environmental investment?

The payback period from commissioning a Kayasand plant can be between 2 to 3 years. This depends on variables like the amount of crusher dust being processed, filler byproduct made into saleable product, the local price of sand and how much we lower operating costs.

Plus, our use of advanced sensors and high-speed electronic control systems make them self monitoring and able to operate with minimal human oversight.

From an environmental point of view, the sand from our plants makes concrete more sustainable.

Every tonne of cement takes about 700-900kg of CO_2 to produce. Our goal is to create manufactured sand of such quality that it reduces these emissions by 60kg for every cubic metre of concrete that cement is used in.

If all of Auckland's concrete was manufactured this way, concrete producers have the ability to save more than 50,000 tonnes carbon emissions each year.

Our plants also turn waste into saleable products, creating a truly circular economy and further reducing the industry's carbon footprint. Waste glass is recycled into premium concrete sand, concrete is recycled back into concrete, and cement substitutes are created from limestone filler and waste slag.

Our sand plants re-use stockpiled by-products and waste from quarrying and recycling.

The perception is that natural sands make concrete better than manufactured sands. This is a myth.

High quality manufactured sands are proven to produce concrete of the highest quality, with higher strengths, durability, and consistency, enabling signifcant reductions in cementitious contents, costs, and carbon emissions. Kayasand technology and plants have been proven to produce the highest quality manufactured sand with full control over particle shape, particle size distribution and consistency.

Mark Mackenzie
Managing Director of Technicrete Pty Ltd

Mark is an accomplished concrete and aggregate technologist. Based in Australia for the last 23 years, he helps global construction companies enhance product quality and optimise processes.

In South Africa, he successfully developed processes for high-quality manufactured sands, leading to the replacement of 80-90% of natural sand in approximately 3 million m^3 of concrete. This achievement was shared and implemented in various Holcim group companies. After relocating to Australia, he held the position of National Functional Manager — Technical at Hanson Australia and chaired the CCAA National Technical Committee. He made significant contributions to the review of AS1379-2007 and focused on enhancing industry skills. He also played a pivotal role in driving the development of standardised and structured training courses on concrete technology. Currently, his company Technicrete provides specialised technical consulting and advisory services.

Why is a Kayasand manufactured sand plant better for the environment?

The V7 sand plant was designed from the ground up to be economically and environmentally sustainable.

Traditional processing of manufactured sand for concrete often requires massive volumes of water that are expensive to clean up and generate huge amounts of sludge. Our process uses no water for washing aggregate, gives off no dust and is typically lower cost to run. No tailings or sediment ponds to maintain, or depositing clays and silts back into environment.

Our plants are designed for use in urban areas where noise and dust must be suppressed and for quarries and processing facilities where space is limited.

Manufactured sand FAQs

What is manufactured sand?

Manufactured sand, also known as M-sand or Man-sand, is a type of sand produced from the controlled crushing of rocks, quarry stones, or larger aggregates into smaller and specifically sized particles. Manufactured sands should not be confused with crusher dusts which are uncontrolled waste products from the crushing process.

What are the common applications of manufactured sand in the construction industry?

Manufactured can be used to replace natural sands in almost all concrete mixes and products. In dry concrete applications (e.g., bricks and blocks), they are typically far superior to natural sands. They are ideal for asphalt mixes and other products where consistency and predictability are necessary.

What impact does manufactured sand have on the environment?

Manufactured sands turn waste products like crusher dust into valuable and value-added products to replace natural sands in concrete. They make a superior concrete from both a performance and durability perspective and reduce the cement content required in concrete. This is a good thing as cement accounts for 8% of global emissions.

Because it reduces our reliance on natural sand, it preserves river and coastal ecosystems and helps to prevent illegal sand mining.

Are there any specific guidelines or standards for using manufactured sand in construction in New Zealand?

In New Zealand, the use of sand in construction is governed by various industry standards and guidelines. The primary organisation responsible for setting standards in construction is Standards New Zealand, a division of the Ministry of Business, Innovation and Employment.

One important standard that might be applicable is NZS 3104:2003 "Concrete Production." This standard provides guidelines for the production of concrete, including the use of aggregates such as sand. It specifies requirements for the quality and grading of aggregates used in concrete, including manufactured sand.

In addition to NZS 3104, other relevant standards or guidelines may include:

- NZS 3121:2005 "Specification for Aggregates from Natural Sources for Concrete."
- NZS 4407:2015 "Methods of Sampling and Testing Road Aggregates."
- NZS 3122:2009 "Specification for Aggregates from Natural Sources for Asphalt."

These standards provide specifications and testing methods for various types of aggregates, which may include manufactured sand used in construction.

What are the largest obstacles to replacing dredged natural sands with manufactured sands?

Vested interests of sand dredging companies, resistance to change and lack of direction from government.

About Kayasand

What Kayasand does.

Kayasand is at the forefront of innovation in the production of manufactured sand. Our use of advanced crushing and screening technologies produces sand of such high quality when compared with natural sand. It creates stronger, more durable concrete with excellent workability and finish.

Manufactured sand from our V7 plants has the potential to save concrete producers 6,000 tonnes of carbon emissions each year and eliminate the need for natural sand dredging, tailings or settlement ponds.

Who Kayasand is.

Kayasand's founder, Andi Lusty, encountered Kemco's revolutionary new V7 crushing technology developed by their chief engineer, Dr Kaya in the early 2000s.

Seeing the growing need for an alternative to natural sand and inspired by Kemco's technology, he founded a company in Waikato, New Zealand to sell it. He named it Kayasand after the technology's inventor.

Andy raised capital and was joined on the board by experienced investors Andrew Turnbull and Chris Sattler. Together, they set out to change the face of manufactured sand in Australia and New Zealand and create a more environmentally sustainable construction industry.

For construction to be more sustainable, concrete must be more sustainable.

KAYASAND
Quality Sand for Sustainable Construction

18 Mexted Place, Riverlea
Hamilton, 3216
Waikato, New Zealand
info@kayasand.com

KAYASAND.COM