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Author Maurice Marquardt
Subject Premium Aggregate Resource Efficiency Discussion Paper - October 2019 updates

The following sections outline the updates to the Premium Aggregate Resource Efficiency Discussion Paper based on more recent data– last updated in October 2019:

Updated Aggregate supply and demand – Background Section, p.3-5

“Aggregate remains New Zealand’s most mined mineral, at 34.3million tonnes, this averages about 7.1 tonnes per head of population. Aggregate is widely used in roading, farming, commercial and residential construction. Updated?”

MBIE classifies aggregate into five products. The quantities below are for 2017.

- Rock for reclamation and protection (524,014 tonnes – 1.2 percent)
- Rock, sand, and gravel for building (9,670,545 tonnes – 23.4 percent)
- Rock, sand and gravel for roading (19,075,788 tonnes – 46.2 percent)
- Rock, sand and gravel for fill (5,116,821 tonnes – 12.4 percent)
- Industrial sand (2,262,094 tonnes – 5.5 percent)

Figure 2: Aggregate production

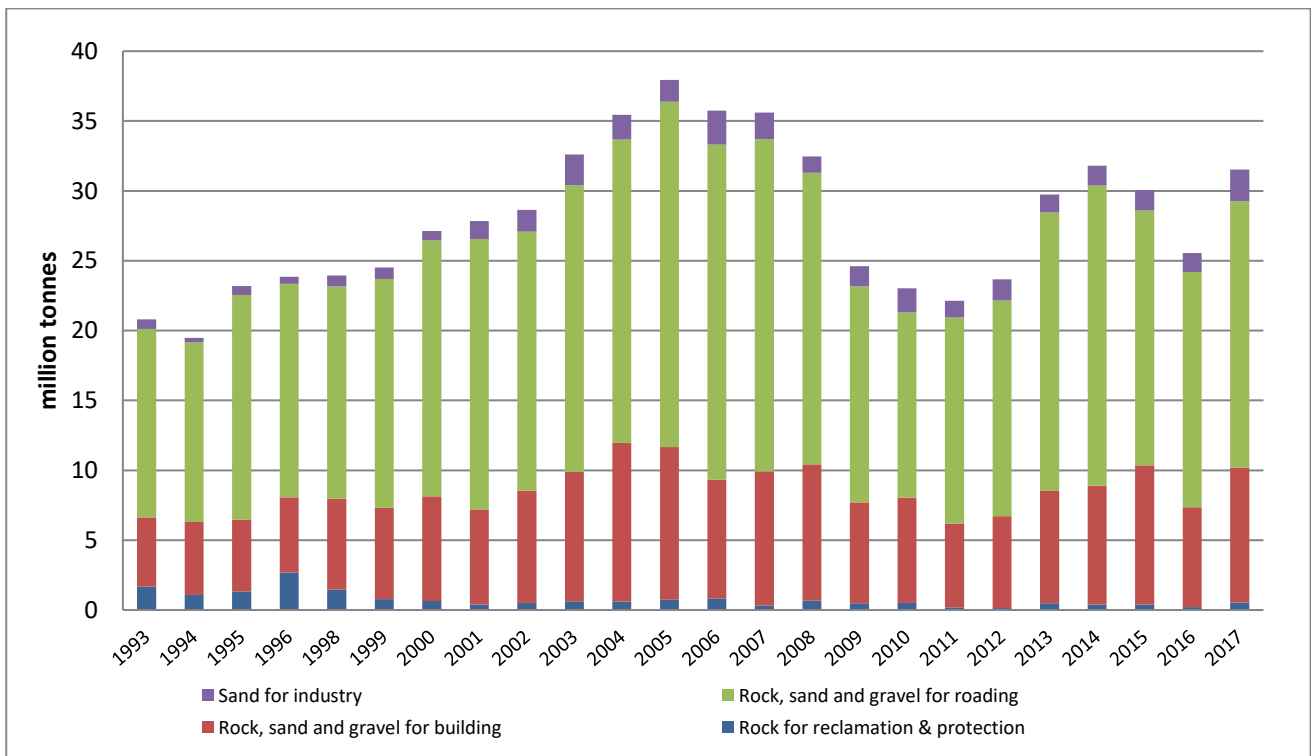


Figure 3.28: Aggregate production since 1993

Aggregate represents the largest raw material used by volume for highways construction. In 2017 New Zealand generated approximately 31.5 million tonnes of aggregates, of which 19 million tonnes were used for road construction¹.

¹ Source: New Zealand petroleum and Minerals: Aggregate production 1993 – 2017.

State highway construction consumes between 28,000 and 39,000 tonnes of aggregate per km and 10,000 tonnes for local roads.²

Figure 3: Aggregate production by region

Region	Aggregate Type					Total
	Roading	Reclamation	Building	Fill	Sand	
Northland	906	62	458	-	-	1,425
Auckland	5,049	22	2,337	1,042	526	8,976
Waikato	3,442	1,477	2,093	1,357	-	8,369
Bay of Plenty	1,117	34	201	63	-	1,415
Gisborne	412	-	-	-	-	412
Hawke's Bay	384	-	187	179	120	871
Taranaki	183	6	171	-	-	361
Manawatu / Wanganui	738	-	676	455	-	1,869
Wellington	739	-	270	291	-	1,301
TMN	536	103	190	93	-	922
Marlborough	-	-	-	-	-	-
West Coast	-	-	-	-	-	-
Canterbury	3,866	48	2,260	1,496	457	8,127
Otago	1,169	12	625	48	-	1,854
Southland	398	-	136	46	-	580
Total	18,940	1,764	9,604	5,070	1,103	36,482

The price of aggregate is relatively low and is in the range of about \$30/tonne for high quality aggregate materials and \$20/tonne for marginal materials. Surfacing aggregates are the highest quality aggregates used on the road - this is reflected in their cost of up to \$40 to \$60 per tonne³.

The 2017 New Zealand Petroleum and Minerals statistics portray an average virgin aggregate cost of \$16.53 per tonne (excluding aggregate for fill). The cost of recycled aggregates is much more variable, dependant on source quarry, production process and the aggregate quality. The 2017 statistics portray RCAg cost of \$24.28 per tonne."

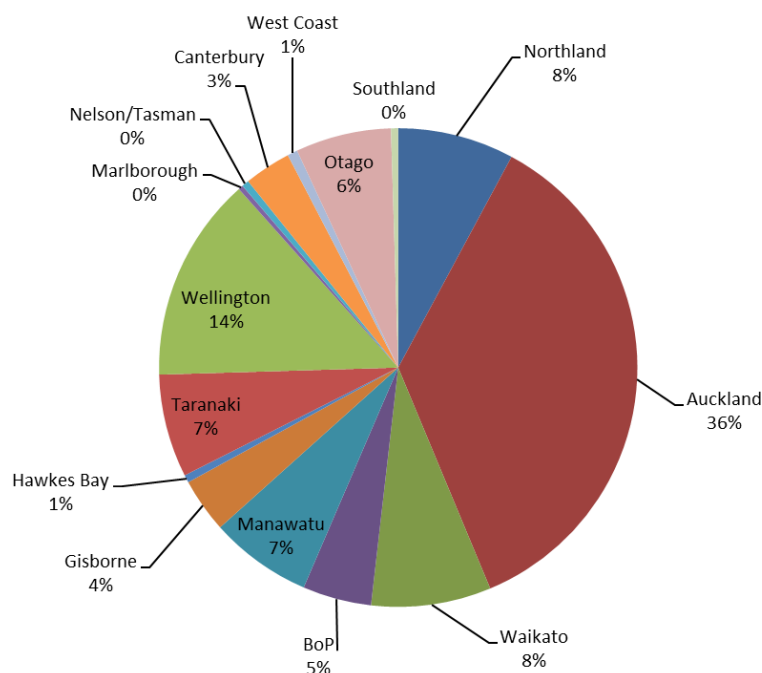
State highway forward work programme – Section p.6

"The capital tender programme and the large maintenance contracts programme earmark approximately \$2b for major capital works and maintenance contracts between 2019-2021.

The graphic below summarises the proposed costs by region. This does not include capital work already underway (e.g. Puhoi to Warkworth or Transmission Gully).

² MoT (March 2014) National Freight Demand Study

³ Source: Discussion with Mike Chilton (Technical Advisor) Aggregate & Quarry Association of NZ



The majority of the funding (52%) over the next 3 years is earmarked for projects in Northland, Auckland and Waikato regions.“

Recycling and marginal materials Section, p. 8

The NZ Transport Agency allows the use of recycled materials in M/3, M/4, M/6 and M/10 ([details provided on the Transport Agency website](#)). There are well documented benefits to using recycled materials and a number of New Zealand case studies and research reports, as well as numerous international case studies to support this. Despite this there has only been very limited uptake of recycled materials in Agency projects. Currently these hover around 3% or less of all mineral materials used in road construction and maintenance projects. Compared internationally, NZ recycling figures can be considered to be very low.

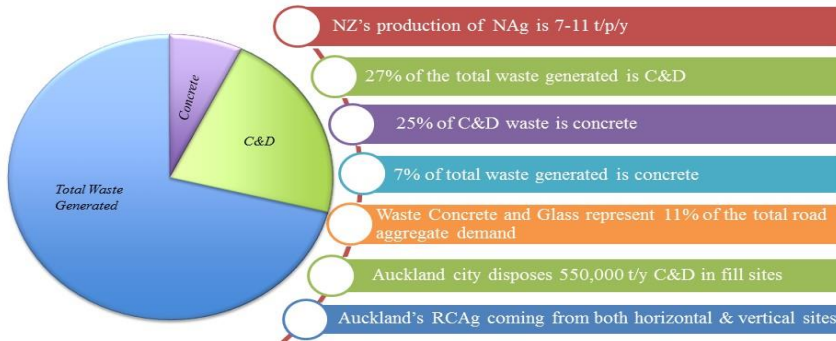
The University of Auckland is currently undertaking research into the performance of marginal materials⁴⁵. Testing on the quality of RCAg will be completed towards the end of 2019, but preliminary results suggest that, despite RCAg having a different chemical structure to virgin aggregates, they would work well and meet the majority of NZTA specification requirements, in some instances, even having the potential to produce a higher quality than virgin aggregates.⁶ The availability of RCAg depends heavily on the number of suitable sites being demolished. The below figure demonstrates New Zealand’s potential to produce recycled aggregates, showing that current waste concrete and glass is the equivalent of 11% of the total road aggregate demand.

⁴ Ardalan, N., Wilson, D., Larkin, T. (2016) An Evaluation of Research Undertaken on Recycled Concrete Aggregates in Road Construction.

⁵ Ardalan, N., Wilson, D., Larkin, T. (2017). Laboratory Performance of recycled Concrete aggregate as Base-course Material. Australasian Transport Research Forum.

⁶ Discussion with Nazanin Ardalan, University of Auckland (2019)

RCAg's Potential in NZ



RAg as an alternative in road construction has not been widely accepted

Figure 1: RACg's Potential in NZ. Source: Nazanin Ardalan presentation at the NZIHT Annual Conference - Application of Recycled Concrete Aggregates in New Zealand's Pavement.