

Newmarket Viaduct Replacement project

RESOURCE RECOVERY CASE STUDY

June 2016



The \$215 million Newmarket Project replaced and upgraded the existing viaduct on the Southern Motorway SH1, between Gillies Avenue and St Marks Road in Auckland. The viaduct is one of the most heavily trafficked pieces of road in New Zealand, with more than 160,000 vehicles per day. Constructed in the mid-60s, it spanned 740 metres across the southern end of Newmarket at a width of 27 metres. Concerns about its resilience and increasing peak time traffic demands led to the decision to replace the viaduct. The replacement began on-site in early 2009 and was completed at the end of 2012.

During the early stages of the project, the project alliance, together with the Transport Agency, defined a set of key result areas (KRAs) to measure the success of the project.

One of the key targets for the project was to recycle 100 percent of the material from the demolished viaduct (excluding contaminated and hazardous materials).

Because of the deconstruction aspects of this project, it provided the opportunity to investigate alternative recycling solutions, identify barriers to resource recovery, and identify ways to facilitate and improve recycling rates.

In New Zealand, the construction and demolition (C&D) industry is one of the largest waste producing industries. The Ministry for the Environment estimates¹ that C&D waste may represent up to 20 percent of all waste going to landfills and around 80 percent of all waste going to cleanfill in New Zealand. Much of this could be diverted through recycling or reusing (resource recovery).

In the transport sector, C&D waste that can be recycled or reused typically includes soil, concrete and asphalt, steel, iron, brick, plastic piping and electrical fixtures.

Resource recovery is an important part of sustainable delivery of infrastructure projects. This is recognised by a number of assessment frameworks within the transport sector. These include Greenroads®, and the Australian Green Infrastructure Council's IS rating tool.

ACHIEVEMENT

At project completion, the deconstruction of the existing viaduct recovered 22,500 tonnes of concrete and 1,400 tonnes of steel. This was achieved by converting the old viaduct segments into crushed concrete for roading aggregates and extracting steel elements for recycling.

The initial top two recovery options for concrete were the reuse of existing segments without crushing and crushing for reuse into new concrete. Both options were later rejected due to identified technical uncertainties, safety considerations and hesitancy of the contractors to take on the associated risk.

The project alliance took full responsibility for the waste generated and worked with the Transport Agency to find uses for it in another Transport Agency projects.

The materials recovered from the old viaduct represent 100 percent of the non-contaminated materials. The majority of the recovered concrete was reused by a demolition company, with some material being reused on other Transport Agency projects and on the Newmarket project itself.

1. MfE 2010, *Construction and demolition waste: how to manage responsibly* (<http://www.mfe.govt.nz/issues/waste/construction-demo>)

KEY SUCCESS FACTORS

The key success factor of this project was being the first project of this size to achieve a 100 percent recycling rate of non-contaminated material in New Zealand. This is due to a number of key factors, including:

- the ability within the Transport Agency to consider the wider network and identify relevant projects to utilize the recycled materials
- agreeing early in the project on a stated objective and key results areas (KRAs) to recycle 100 percent of the non-contaminated material generated from the demolition of the old viaduct. Without this target, it is very likely that less material would have been recycled and that the waste recovery initiative may have been put into the 'too hard basket'
- working together with project partners and stakeholders enabled the project team to identify cost effective solutions to recycle the waste.



BENEFITS

While the overall project costs and benefits from recycling were not recorded on the Newmarket project, material recovery has the potential to generate financial benefits on infrastructure projects.

Depending on the project set-up, the cost of recycling (including salvaging, processing, storage and transportation and revenue from materials sold) has the potential to be lower than disposal costs and cost of virgin materials. This is particularly so when taking into account transport distances, and up- and down-stream impacts and costs.

Recovering material destined for landfill and cleanfill also offers a range of potentially significant benefits on environmental and social issues (eg lower resource use, improving local capabilities and resources, and improving recycling infrastructure).