

CASE STUDY

APL Facility - Hautapu Cambridge - A Foster Construction Group project

INTRODUCTION

Project Name: APL Facility - Hautapu Cambridge

The building: Just under 49,000m² (the size of six rugby fields), APL comprises a factory and three linked double-storey office buildings with viewing platforms/windows into the manufacturing hubs, meeting rooms and staff break-out areas that access landscaped spaces and pathways.

Client: Profile Group

Construction company: Foster Construction Ltd

Project status: Completed December 2021

Project certification: 5 Green Star NZ

Waste diversion target: 90% (achieved)

Reusing and recycling construction and demolition waste, once seen as 'good to do', is now vital in reducing our impact on the environment. Keenly aware that the construction industry is responsible for up to 50% of New Zealand's landfill volumes, the Foster Construction Group Ltd has set out to create a new benchmark for sustainable building.

Their commitment to mitigating the environmental impact from construction, mainly through resource recovery, has meant 90% of all waste from the new APL facility in Cambridge has been diverted from landfill. With sustainability and employee wellbeing at the core of Profile Group's operations, a huge amount of importance was placed on constructing a high-quality building while protecting the environment.



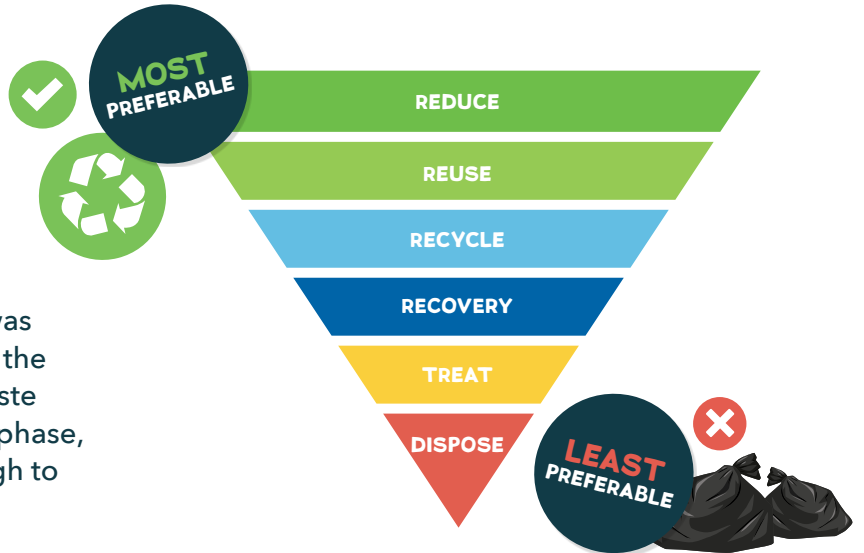
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APPROACH TO WASTE REDUCTION

Foster Construction's approach to waste reduction was simple:

- set a target
- follow the waste hierarchy
- continually measure performance.

Diverting 90% of all waste from landfill was an ambitious target. Setting it early on in the project enabled the team to consider waste reduction across the whole construction phase, from design to procurement, right through to on-site construction processes.



DESIGN PHASE

During the early design phase of the new APL facility, Foster Construction worked with consultants to select materials that support a circular economy, specifying products that could be reused and recycled throughout their lifetime, and through the construction phase should any offcuts be generated.

For example:

- Products with environmental certifications were specified - this means more environmentally sustainable materials and products which can be reused or recycled.
- Kingspan roofing was cut to maximum container length and purlins designed to the specific roof material length so no cutting was required on-site, reducing labour and waste. This also maximised transportation opportunities.
- The slab was designed to be water cured, reducing additional products and associated waste.
- Non-recyclable fibre cement boards were removed from project and soffit linings were changed to timber.
- XLam designed and manufactured to exact dimensions, resulting in no waste on-site
- Made-to-fit steel downpipes replaced PVC material, reducing cutting waste and on-site labour.
- The building was designed to specific bay lengths, optimising glass sheet sizes and aluminium extrusion length.

PROCUREMENT PHASE

Foster Construction initiated early engagement with suppliers on takeback schemes for materials and packaging. Similar early engagement with subcontractors enabled designing out of waste and ensuring materials came on-site in minimal packaging. Where possible, materials were ordered to specified lengths to minimise offcuts.



ON-SITE WASTE REDUCTION REUSE AND RECYCLING

All personnel were inducted to site, learning waste reduction targets and processes. Over 15 bins located on site meant easy segregation of materials for reuse and recycling. On-site waste areas were inspected daily to ensure no contamination within the bins and were audited once a week.

REUSED WASTE

Concrete washout was:

- placed into moulds to create concrete deadman for use as weights on future construction projects.
- captured and crushed on-site for reuse in on-site roadways.

Kingspan panels were:

- repaired if damaged and used on roofing contractor's new office and workshop.

Timber cable drums and pallets were:

- used to create bar leaners.

Kingspan polystyrene packaging blocks were:

- used as insulation on the project and given to site personnel for use as insulation in their own homes.

Decortech timber panel offcuts were:

- taken to contractors workshop for reuse.

RECYCLED WASTE

Concrete and cleanfill was:

- crushed and recycled into road and drainage metal and builder's mix.

Timber was:

- chipped and recycled into landscaping products (bark) and animal bedding.

GIB® board was:

- shredded and recycled into fertiliser.

Steel was:

- processed and recycled into new steel.

Cardboard was:

- baled and recycled into new cardboard.

Plastic wrap was:

- sent for re-processing in Asia (no local solutions available at the time).

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ON-SITE WASTE REDUCTION REUSE AND RECYCLING

CONTINUED

Tin cans and plastics were:

- sorted and sent to local companies for recycling.

PVC pipe was:

- chipped and recycled into new PVC pipe.

Glass bottles were:

- cleaned and recycled into new bottles.

Polythene was:

- recycled into farm products (Tuffboard and Tuffdeck).

Paint buckets were:

- returned to Resene for cleaning and recycling.

Insulation was:

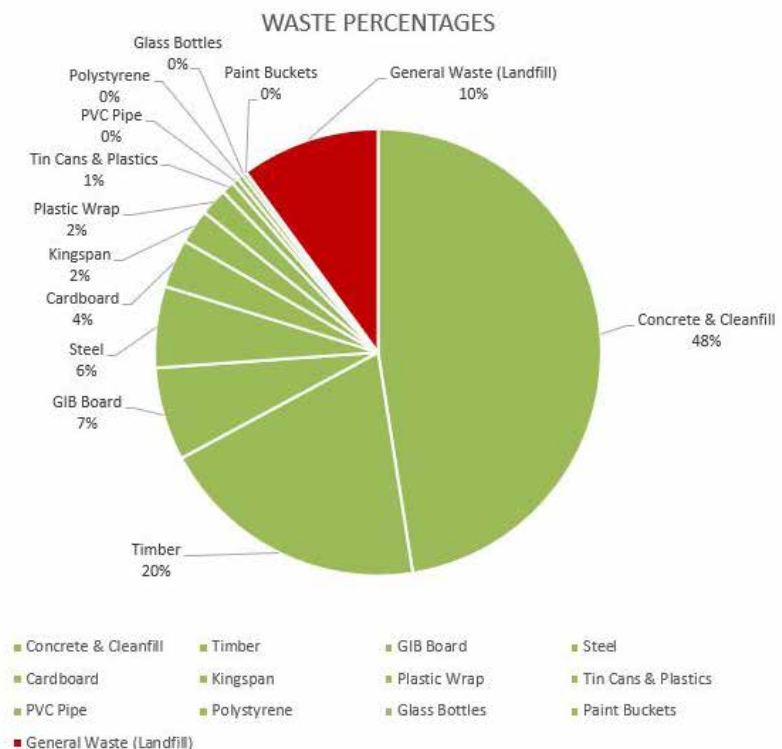
- returned to Autex for recycling.



MEASURING

All waste quantities were reported on by weight to provide accurate statistics.

- Waste collector weighed materials by weight.
- Where materials couldn't be weighed, Branz Convert Waste Volume to Weight calculation was adopted.
- For materials reused by public or industry the Branz REBRI Waste Transfer Form was utilised.



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WASTE REDUCTION SERVICE PROVIDERS

Materials which could not be reused or repurposed were sent to local recycling companies.

Waste Stream	Service Provider
Concrete and cleanfill	Kidd Contracting / D & T MacDonald
Timber	Revital Group
GIB® board	Revital Group / Good Wood Recycling
Steel	Sims Pacific Metals
Cardboard	Oji Fibre Solutions
Plastic wrap	Waste Management
Tin cans and plastics	Waste Management
PVC Pipe	Marley
Polystyrene	Public / Industry
Glass bottles	O-I New Zealand
Paint buckets	Resene
Polythene	Plasback NZ
Waste collector	EnviroWaste / Waste Management

CONCLUSION

Foster Construction's Sustainability and Compliance Advisor Jael Clausen noted the company have not only achieved the target of diverting 90% of all waste from landfill on the APL Hautapu project, but they also disposed of less than 1.3kgs of general waste per square metre of floor area.

"To put this into context, the average size house in New Zealand is 156 metres squared," says Clausen. "On average, a typical house build generates four tonnes of waste which equates to over 25kgs of waste per square metre."

APL Hautapu is a Green Star project, targeting a 5-star built rating. Green Star is a holistic

sustainability rating system endorsing smarter building, energy and water savings and lower running costs.

"We've had to rethink the way we construct certain elements to meet the Green Star criteria," says Clausen. "Working on a facility of this scale and knowing it has been built sustainably has been a personal highlight for me. It's been inspiring to witness the positive change this project has had on our overall construction practices to build sustainably."

"The APL Hautapu project has had a significant influence on the way we approach waste reduction on all projects."

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“Thinking outside the square and implementing innovative initiatives, it’s now easy to take these learnings on reducing, reusing, and recycling waste to accomplish waste reduction on all projects.”

Diverting waste from landfill doesn’t only have a positive impact on the environment, it’s also considerably more cost effective. For example, disposing of concrete, plasterboard, and timber in a landfill would cost up to twice as much as recycling this material. Reusing and repurposing

these valuable resources and materials also reduces the need to harvest new raw materials, saving further production and energy costs.

Jasmax Principal Nick Moyes, who led the architectural design team on the APL project, said “Foster Construction played an integral part in bringing the most efficient and effective construction methods to the project, centred on a philosophy of design excellence established by Profile Group”.



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