

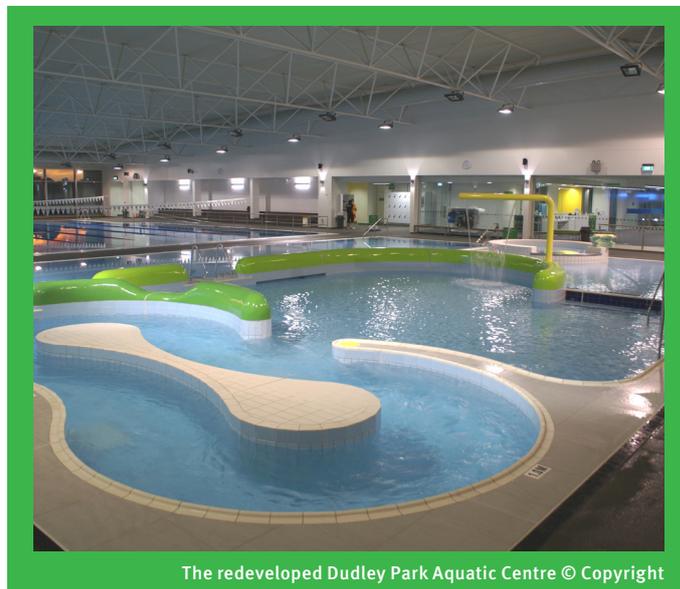
Waimakariri District Council Dudley Park Aquatic Centre Rangiora

Introduction to the Project

This case study demonstrates how waste can be separated for recycling and reuse. This may take place during construction or demolition and can be done on-site or off-site.

Client: Waimakariri District Council
Site: Dudley Park Aquatic Centre, Rangiora, Canterbury
Demolition Contractor: Frews Contracting Ltd
Construction Contractor: Naylor Love
Construction Waste Contractor: Silver Skips

Naylor Love and Frews Contracting signed a Memorandum of Understanding with the Waimakariri District Council agreeing to reduce waste going to landfill and cleanfill. Waimakariri District Council also included waste minimisation conditions in their contracts with Frews Contracting and Naylor Love. Target Sustainability, through funding from the Canterbury Waste Joint Committee, supported this waste reduction project.



The redeveloped Dudley Park Aquatic Centre © Copyright

Demolition Waste Recycling

During demolition, Frews Contracting Ltd. achieved the following results:

Waste Materials	Reuse and Recycling		Disposal	Comments
	On-site (tonnes)	Off-site (tonnes)		
Soil	128	192		Approximately 128 tonnes of soil was reused on-site for site leveling. The rest of the soil was sent to a building site to facilitate land reclamation for a new subdivision.
Vegetation		9		This included three living trees which were sold and relocated to a lifestyle block. The rest was general vegetation removed from the site and one tree that was too heavy for the machinery to extract whole. The vegetation was mulched at the Frews Contracting yard. It will be reused on farms for compost.
Metal		14		This included steel re-bar removed from the reinforced concrete. This was taken to a scrap metal merchant in Christchurch for recycling.
Timber (untreated)		3		Longer lengths of timber were put aside for resale. The rest was chipped and sold for boiler fuel for industrial boilers.
Concrete	975	500		Some of the concrete was crushed on-site and used to fill the old pool hole. The larger blocks were taken off-site. These will be crushed and used as base course for the Southern Motorway extension project.
Mixed construction waste		2	1	This was sorted off-site due to time and area constraints. This category included mainly timber, glass, pool floats, chairs etc. Approximately one tonne was recovered by Frews Contracting. The remaining two tonnes were sorted at another sorting site. It is estimated by the sorting site that 50% of this was recovered (one tonne) and 50% was sent to landfill (one tonne).
General waste			23	This included a large amount of asbestos and some treated timber. It was sent to landfill.
TOTAL (TONNES)	1,103	720	24	
Percentage	60%	39%	1%	

NB: The tonnage figures in the table include actual and estimated tonnage. The soil and concrete figures were provided in cubic metres and converted to tonnes using a standard conversion factor. The living trees were estimated by Frews Contracting to be approximately one tonne each.

Demolition Waste Recycling

The demolition was undertaken by Frews Contracting Ltd. They achieved a total reuse and recycling rate of 99% (60% on-site and 39% off-site). More than 1,800 tonnes of materials were recovered for reuse and recycling.

Frews Contracting did the following to achieve these results:

- Prepared a waste management plan using the REBRI (Resource Efficiency in the Building and Related Industries) Deconstruction Waste Plan. The Plan included a detailed description of the deconstruction methodology and the project waste reduction objectives.
- Crushed approximately 975 tonnes of concrete using a mobile concrete crusher for reuse on-site as fill.
- Reused approximately 128 tonnes of soil on-site to level the Dudley Park site.
- Removed approximately 192 tonnes of soil from site for reuse as land reclamation for a new subdivision.
- Sold and relocated three living trees (Phoenix Palms) to a lifestyle block.
- Removed the remaining vegetation from site to the Frews Contracting yard, to be mulched and reused on farms for compost.
- Manually removed untreated timber which was taken to the Frews Contracting yard for re-sale (longer lengths) or chipping and use as boiler fuel.



The concrete crusher used to crush concrete for reuse on-site © Copyright



Vegetation that was removed from site, mulched and reused as compost on farms © Copyright



One of the Phoenix Palms that was relocated from site © Copyright



Crushed concrete on-site was used as fill © Copyright

Construction Waste Recycling

As space on the Dudley Park Aquatic Centre construction site was very limited, the use of skips and off-site waste sorting was considered to be the best option.

Silver Skips collected the general waste skips and took them, in the early stages of the project, to the Styx Mill Eco-Depot materials sorting site and, later in the project, to the Silver Skips yard for off-site sorting. Once at the sorting site, the material from the mixed skips was either put over a sorting line where the materials are

separated into different waste categories or the skip was emptied and the material manually separated into different waste categories. Where space allowed, some waste streams, for example concrete and co-mingled recycling, were collected separately.

Silver Skips sent the skip composition sheets to Naylor Love, who compiled the waste information using the REBRI Project Waste Management Record. Naylor Love and Silver Skips achieved the following results:

Waste Materials	Reuse and Recycling	Disposal	Comments
Type	Tonnes	Tonnes	
Concrete and rubble	13.2		Concrete and rubble was collected in a separate skip. This was crushed off-site and used as an aggregate for roading projects.
Metal	6.9		This was collected and sent for scrap metal recycling.
Plasterboard	4.1		This was crushed and reused as a soil conditioner for horticultural seed germination.
Timber (treated)		2.4	Some of the treated timber was stockpiled, waiting for future reuse options (20%). The majority of the treated timber was disposed of to landfill (80%).
Timber (untreated)	15.9		This was chipped for use as a hog fuel for consented industrial boilers and as a feed stock for processing into wood pellets or for calf bedding.
Building material for reuse	7.1		This category included any building materials that could be salvaged for reuse. The materials are sorted into different categories and stored at the Silver Skips yard. This included longer lengths of building materials such as fibre glass insulation, roofing iron and Hardie Board. The materials were advertised as free building product using the Christchurch Waste Exchange.
Cardboard	4.3		This was separated and sent for recycling.
Co-mingled recycling (kerbside)	0.5		This was collected in two 45 litre recycling crates and put out for council kerbside collection weekly. This included mainly cans, paper and plastic bottles from staff and sub-contractors lunch waste.
General waste		14.6	This was material from the general waste skips that was separated, but was not recovered for recycling. This included plastics, polystyrene, fibre glass insulation off-cuts, tile off-cuts and carpet underlay off-cuts.
General waste (kerbside)		1.2	This was mainly food waste and waste unsuitable for recycling. It was collected separately in council refuse bags for weekly waste collection. This waste was collected separately to ensure the construction waste was not contaminated.
TOTAL (TONNES)	52	18.2	
Percentage	74%	26%	

NB: The figures in the table include actual and estimated tonnage. The co-mingled recycling results were estimated by using the estimated weight of the 45 litre recycling crates put out at kerbside for recycling each week, multiplied by the number of weeks the construction occurred. The general waste collected at kerbside results were estimated from the approximate weight and number of bags put out at kerbside each week, multiplied by the number of weeks that construction occurred.

Construction Waste Recycling

Naylor Love and Silver Skips, by working together, diverted 74% of the construction site waste from landfill and cleanfill, recovering approximately 52 tonnes of materials for reuse and recycling. This included concrete, untreated timber, cardboard and plasterboard.

Naylor Love did the following to achieve these results:

- Prepared a waste management plan using the REBRI (Resource Efficiency in the Building and Related Industries) Construction Waste Plan.
- Set clear waste management goals for the project. Their goal was to recycle at least 70% of the waste.
- Observed the off-site waste separation facilities to find out what would happen to their waste and recycling.
- Agreed to a procedure with the recycling facility to ensure that every skip removed from site would be analysed for recycling content when it was separated by the skip collection company. Results of this analysis provided the recycling figures. Photos of the bins as they were emptied were taken to record each load.

- Required their skip collection company to use a form to track the skips from site and record the quantities of waste categories.
- Provided induction on the waste system for all staff and sub-contractors as they arrived on-site.
- Waste management was included in the regular tool box meeting agenda.
- Located two co-mingled recycling crates outside the staff room for staff and sub-contractors to use.
- Reused plasterboard off-cuts, wooden shutters and metal off-cuts on-site where possible.
- A separate pile was used for steelwork off-cuts and excess reinforcing steel. These were used throughout the construction as tie bars and dowels where possible.
- Timber off-cuts were kept in a separate pile also for on-site reuse as noggins, stop ends, chocks, stakes, wedges and shutter plugs.



Recycling crates for staff and sub-contractors use © Copyright



Timber lengths stockpiled for reuse on-site © Copyright

Difficulties (Demolition and Construction)

- Some off-cuts of timber, wooden shutters and rebar were reused on-site many times before being disposed of in the skip. However, it is difficult to capture this on-site reuse in the waste and recycling figures. **TIP: Ask staff and sub-contractors to record how much reuse is occurring on-site. This could be a simple recording sheet that they complete at the end of each day.**

Summary

The Dudley Park Aquatic Centre has undergone an approximately \$9.7 million redevelopment. The new pool complex has four indoor pools, including a heated leisure pool, a learner's pool, a spa pool and a 25m long main pool with eight lanes.

Want more information? Visit the Target Sustainability website at www.targetsustainability.co.nz

The REBRI guides are available at www.rebri.org.nz