

BURWOOD RESOURCE RECOVERY PARK

Recovering valuable resources for the rebuild of Christchurch
from the deconstruction process

OUTLINE

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1 Introduction

Christchurch was hit by a second major earthquake on 22 February 2011. This quake destroyed much of the CBD and large parts of the eastern suburbs. In the worst case, the city is faced with demolition of possibly around 1000 CBD buildings, up to 500 commercial buildings outside the CBD, and perhaps 10,000 houses.

Burwood Resource Recovery Park Limited (BRRP) was established urgently to manage the receipt and resource recovery processing of mixed demolition material from Christchurch's earthquakes, to deliver an immediate and low risk solution that will address the enormous scale of the project, as well as deliver best value from safety, economic, environmental and cultural perspectives.

The operation was initially developed by Christchurch recycling service provider Transpacific Industries Group (NZ) Ltd (Transpacific), working in partnership with Christchurch City Council (CCC) and Canterbury Earthquake Recovery Authority (CERA).

The BRRP company is now under the ownership of Transwaste Canterbury Limited (Transwaste). Transwaste is a joint venture between Transpacific and five Canterbury Councils (Christchurch, Ashburton, Selwyn, Waimakariri and Hurunui), and owns Kate Valley Landfill which takes all municipal solid waste from the five Council areas. The operation is establishing a state-of-the-art resource recovery plant at Burwood.

Around 4.25 million tonnes of demolition material is expected from the demolition of buildings. The "clean" concrete and brick rubble is likely to go to Lyttelton Harbour reclamation project and other sites, as it will require only minor processing. The mixed demolition material which requires major processing to be separated into useful components, is expected to be taken out of the city to Burwood Resource Recovery Park (BRRP).

Transwaste, along with its Council and Transpacific partners, is committed to maximising the recovery of resources from the demolition and deconstruction. This is to uphold its valued environmental and sustainability principles, and to ensure that adequate suitable materials are on hand for the rebuild of the city.

It is also essential to minimise residual waste volumes from the deconstruction to the Canterbury regional landfill at Kate Valley, as this landfill has physical and operational constraints on the maximum daily volume it can handle. Depending upon its final volume, to send all of the unprocessed demolition material to Kate Valley could take 20 years, so minimising the residual volume by recovering any material that does not have to go to landfill is essential.

2 BRRP Overview

A company has been established to manage the receipt and resource recovery processing of mixed demolition material from the earthquake.

The operation is known as Burwood Resource Recovery Park (BRRP). Transpacific Industries Group (NZ) Ltd (Transpacific) is undertaking the operations for BRRP and is working with other local and national recycling and engineering companies to establish a state-of-the-art resource recovery plant at Burwood.

Christchurch City Council (CCC) is leasing specific areas of the Burwood site to BRRP for a five year period.

This has enabled the Burwood site to be developed without delay as the staging area for stockpile and recovery operations to cater for removal of earthquake mixed demolition material from the city.

The BRRP operation at Burwood has been receiving and stockpiling demolition material since 7th March 2011.

3 BRRP Functions

The functions of BRRP are:

- To cater for rapid removal of earthquake demolition material from the city through operation of the Burwood site under a lease from CCC, as the staging area for initial stockpiling of mixed demolition material, and later resource recovery operations.
- Acceptance of mixed demolition material.
 - BRRP is likely to be the primary site where the bulk of the mixed unsorted demolition material will be taken after initial recovery of more valuable materials.
 - Recovery processes will be multi-faceted with an initial pre-sort of bulk materials, followed by a second stage coarse sort by heavy machinery, followed by a third stage fine sort process involving mechanised screening and manual sorting lines for recovery of smaller metals, untreated timber, plasterboard, glass, fibre (incl carpet), fittings, plastics, with residual waste with no reuse potential being sent to landfill.



4 Operating Objectives

The objectives of the BRRP operation are:

- To minimise residual waste that needs to go to landfill from the demolition material received.
- To achieve the maximum recovery of useful resources from the demolition material, for reuse in the rebuild of Christchurch.
- To allow the rapid removal of demolition material from demolition sites within Christchurch.
- To safely stockpile demolition material in a manner that facilitates the fastest possible removal from the demolition sites, whilst ensuring maximum resource recovery and sorting will be possible at a later stage.
- To undertake the operations in the safest possible manner, safeguarding the health of all users of the site, the public, and operational staff.

- To utilise local contractors and labour wherever possible, as part of the recovery process for the City.
- To provide employment for local people as far as is possible.
- To complete the resource recovery process within the five year timeframe.

5 Assumed Composition of Demolition Material

Until the site has received a consistent flow of typical mixed unsorted demolition material for a reasonable period, it is necessary to make assumptions about the composition of the material, to enable calculation of the various volumes of recoverable and residual material.



The initial assumptions used were based on the figures provided by CCC and CERA. These will be updated after more detailed assessment of CBD buildings.

BRRP is primarily for the mixed unsorted demolition material. Clean concrete and brick is able to be taken at Lyttelton Port and other cleanfill sites around the city, and most demolition contractors will usually try to recover any other valuable materials on site.

This means the nature of the mixed material received at Burwood is low quality in recycling terms, low in value of potential recovered material, and high in difficulty of processing. This material will require a very sophisticated sorting process to recover the maximum amount of reusable products.

6 Demolition Material Receipt Process

With the desire to move the demolition material out of the city as fast as possible once the clearance process commences in earnest, BRRP faces a major challenge at the Burwood site to manage the receipt of the material in a safe and efficient manner. With potentially high volumes arriving per day, the material receipt process needs to work well for all parties.

Once at the site for stockpiling, the truck load is given a quick visual inspection to ensure it is the correct type of material for that site. This is undertaken by a “Spotter” standing on an elevated tower, enabling the visual inspection of the truck load contents.

The spotter then directs the truck to the specific location within the stockpile zone where the material is to be tipped. In the stockpile area, there may be several “faces” being developed at a time, set apart from each other, so that trucks have minimum delay waiting to tip.

This process will be occurring for 12 hours per day, six days per week, including in the dark in winter, until the demolition material is removed from the City.

7 Material Stockpiling Process

The stockpiling of the material needs to be performed with care, to preserve the recovery potential of the materials. A bulk pre-sort occurs upon tipping, before the material is stockpiled. Excavators pull out any bulk metals and other massive objects, before carefully placing the balance of the material into a stockpile that may grow to 20 metres in height.

8 Material Sorting Process

The expected high volumes of material, and their expected rapid arrival timeframe, means that very little sorting of material, apart from the bulk pre-sort, can occur during the majority of the material receipt phase.

BRRP is planning a three stage sorting process for the mixed demolition material.

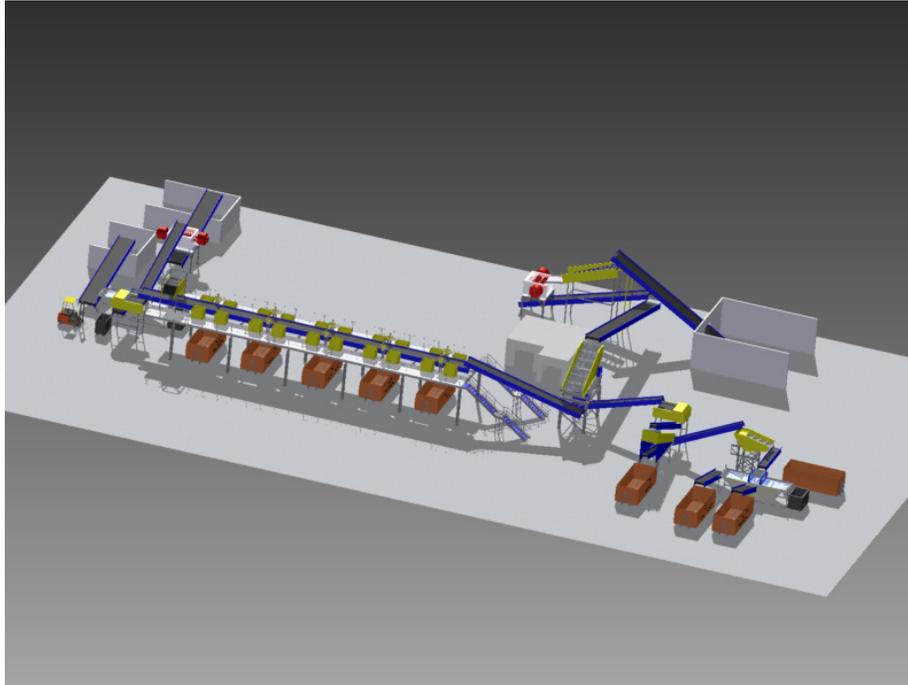


- **Stage 1: - Heavy pre-sort of material as it arrives at the stockpile site.**
 - Using excavators to pull out large items during the material receipt process.

- **Stage 2: - Bulk coarse sort through “mining” of the stockpiles.**
 - Using excavators to pull out large materials, such as concrete, steel, treated timber, large masonry.

- Removal of larger material from the pile prior to the Stage 3 finer sort process, by using heavy duty mechanised screening plant.
- **Stage 3 – Fine sort of material after bulk coarse sort.**
 - The residual from the bulk coarse sort will go through a combination mechanised and manual state-of-the-art fine sort process, including elevated conveyor sort lines, with manual picking and automated removal of selected material types.
 - The material will be put through a high power shredder to reduce items to a size that can be readily manually picked off the sort line.
 - Prior to going across the sort line, the material will be screened to remove the very small particle size fraction (to hardfill/soils).
 - Magnets will be used to recover ferrous metals, and eddy current drums used to separate non-ferrous metals.
 - Staff on elevated sort lines will remove fibre (cardboard, paper), fittings, untreated timber, plastics, and gib/plaster board.
 - Up to 10 different products are expected to be recovered from the process for re-use.
 - Residual waste from the fine sort process will go to landfill.

BRRP is making a substantial investment in high technology sorting plant equipment and mobile machinery to properly undertake this sorting process and achieve the maximum recovery.



Schematic of BRRP
Fine Sort Plant

9 Residual Waste

The resource recovery process will not be able to turn all stockpiled material into a reusable resource, and there will be a residual proportion of material that cannot be further sorted economically or safely. This residual must be disposed of in a modern sanitary landfill.



Minimising the residual waste to landfill is a critical aspect of the BRRP operation, as the cost of disposal at sanitary landfill poses the largest commercial risk to the operation.

The residual waste that will come out of the BRRP recovery process will be relatively inert, and have few if any of the environmentally challenging properties of municipal solid waste.

Landfilling the material from the BRRP recovery process will be undertaken on site at Burwood in a new landfill constructed for the purpose to modern standards. This will save many thousands of truck trips and associated emissions, as the only alternative is to truck the material to Kate Valley Landfill, some 70km north of the City.

Burwood is a closed landfill, which operated from 1985 to 2005, taking municipal solid waste from Christchurch and surrounding districts. Utilising an undeveloped area of the former Burwood landfill for disposal of relatively inert material from the BRRP sorting process, developed to modern standards as a new landfill purely for demolition waste, is the best environmental solution for the residual material.

10 Timing

The first phase of the operation to prepare the Burwood site for receipt of the demolition material is complete. This has involved construction of sufficient material receipt and stockpile pads to cope with the initial influx, construction of access roading, water supply, fencing, and installation of administration systems.



The second phase is receipt of demolition material from both commercial and residential building demolition. The sheer volume of this material arriving daily and requiring safe stockpiling for later sorting, requires the full attention of the site operators. The period of time involved in Phase 2 will depend upon the volumes to be moved, and the pace of the demolition approval process, but is expected to be at least from March 2011 to well into 2013.

The third phase will be the resource recovery from the stockpiled materials, commencing once the inflow of material is at a level where recovery operations can safely commence. During Spring and early Summer 2012/13, the necessary plant, facilities and staff will be established, for commencement of resource recovery in earnest in early 2013.

The Phase 3 operation is expected to last five years.

11 Health and Safety

The scale of the operation, the nature of the site and materials to be handled, mean that there will be serious safety risks and hazards to be managed.

A Health and Safety Plan for the BRRP operations has been developed and is operational.

12 Financial

The BRRP operation is a very unusual project as normal commercial undertakings go. It will earn most of its revenue in the first two years of the demolition material receipt phase.

It will then face four to five years of high operating costs, with comparatively minimal revenue, as the recovery work proceeds. This creates some unusual issues for taxation efficiency and other accounting issues.

It also means BRRP must be very sure its gate charges are sufficient, as once the material is on site and the obligation to process it has occurred, it will be too late to increase the charges if they are found to be less than is necessary to cover the costs of processing and disposal.

This is especially challenging, given the unknowns in the volume to be received and the composition of the material.

With the preference by building owners, insurers, and demolition contractors to strip the more valuable materials on site and send only the residual “rubbish” to Burwood, the revenue from sale of recovered material will be relatively low compared to the operating costs of the recovery process.

At the invitation of BRRP, CERA utilised an independent auditor, from the Office of the Auditor-General, to review the BRRP financial models, and satisfy itself the gate charges levied by BRRP are fully justified - given the high level of uncertainty in volumes and material composition, the level of investment in sophisticated plant necessary to process the material, and the operating costs for the recovery operation.