

Working Quarries Protecting the Environment

Holcim New Zealand's Westport Quarry



The ambitious plan to fully restore the land surrounding the Holcim New Zealand's Westport quarry began in the 1980s to mitigate the visual impact of quarry operations. Since then, the project has developed into a plan to improve the biodiversity of the quarry and its surroundings.

This ongoing commitment was recognized when Holcim New Zealand won the Environmental Excellence Award for quarry rehabilitation in 2007. The project was being praised as "an excellent example of a company taking long-term responsibility for the restoration of all the land associated with a major cement manufacturing facility."

The overall goal of the rehabilitation at Westport, to be achieved by 2040, is to restore a mosaic of indigenous forest, a lake within the quarry area and wetland communities similar to that which existed prior to human (principally European) arrival. So far over 60 hectares have been rehabilitated or set aside for regeneration.

The land to be restored has been divided into four zones, reflecting the specific ecological makeup. The most ecologically sensitive zone is the coastal restoration zone adjacent to colonies of the endangered New Zealand fur seal and little blue penguin. The rehabilitation plan necessitated the establishment of a nursery at the site to raise eco-sourced indigenous species under local conditions. This nursery supplies Holcim with up to 50,000 plants each year.

The project has had scientific input from the early stages from the School of Forestry at Canterbury University. The university has supervised projects to assess the re-establishment of native species in the quarry environs and has presented reports on the success of the rehabilitation so far. With this in mind, Holcim has provided grants to Canterbury University for the study of quarry rehabilitation. These studies will serve as a basis for ongoing monitoring work and should provide a long-term appreciation of the results of the program and hopefully establish the site as an important example of rehabilitation.

The resources Holcim has provided and the commitment of Holcim employees over the past 20 years set an example of dedication and continuing effort even in difficult times. Employees have volunteered their time and energy during these years to make sure the rehabilitation work will continually be a source of pride.

Winstone Aggregates Auckland Green Gecko Relocation Project



As part of a wide-ranging environmental mitigation and enhancement programme at its new Symonds Hill pit at the Hunua Quarry south of Auckland, Winstone Aggregates has developed, implemented and monitored a relocation programme for the rare and at-risk Auckland Green gecko (*Naultinus e. elegans*).

Auckland Green Geckos (AGG) are a taonga species to local iwi, in particular Ngati te Ata and Ngati Tamaoho, both of which were represented on the Papakura Kaitiaki Group, a group representing iwi that have interests in the Hunua Quarry site. In addition to this, the local council, Department of Conservation, and residents of the surrounding area see the geckos as an important part of the local ecosystem that has existed for generations.

All groups came together for the gecko relocation project. In total 39 green geckos were relocated from the proposed quarry site to an area of native bush also on the quarry site.

Winstone Aggregates is also undertaking a wider range of restoration initiatives to compensate for habitat which will be lost through works associated with the development of the new Symonds Hill pit. These include planting indigenous forest (over 39.9ha of retired pasture in the Hay paddock and Friedman blocks), and the control of mammalian browsing and predatory pests over an area of 100ha of surrounding regenerating forest adjoining the proposed pit. This has focusing on rats, possums, stoats and feral cats. These species are widely implicated in the decline of lizard populations on the mainland including arboreal geckos such as Auckland Green Gecko.

Pest control has increased the abundance of invertebrates (some of which may be prey for lizards) and native birds; and increased the availability of fruits and seeds (which may also be eaten by lizards).

The environment, the community and quarrying

Back in 2011 the Dipton Lime Quarry in Southland signed up a covenant to preserve the Kast faces and protect all native species on the Western face, the Castle Rock natural limestone outcrop.

Ravensdown's Dipton quarry was established in the 1930s and has operated continuously supplying agricultural lime to Southland and Central Otago. The site employs five people and contributes \$1 million to the local economy. The original plan was to quarry the whole area but the local community

was worried the landscape feature might be removed or damaged during the ongoing quarrying operation.

"We take our role in the community very seriously and created a quarry management plan to sterilize a substantial amount of resource and keep the western face intact. "It has significantly altered the way we operate the quarry," said Craig Hendry, Ravensdown's Lime Operations Manager and former AQA Board member. "It has reduced the life of the quarry but we recognise the importance of the outcrop as part of the local landscape and we are pleased to see it stay."

Because the majority of Dipton staff are locals with a vested interest in the preservation of the Western face, they have had input into the quarry plan and worked with the local community to ensure the covenant is achieved. From an operational perspective it has added complexity to the quarrying process with more precise blasting required, regular stripping and an increase in benching. As a responsible co-operate citizen with a focus on sound environmental practice Ravensdown have implemented these changes to achieve a positive outcome for all stakeholders.

It has been an excellent example of co-operation between the local community, Ravensdown and the Southland District Council. Through this covenant Ravensdown Lime will:

- Stop any exploration for, or mining or quarrying of, minerals on the western face.
- Retain all native trees, shrubs or plants.
- Forbid construction or erection of any buildings on the face.
- Prevent any livestock on the western face.

"Overall I believe it has strengthened our relationship with the local farming community and preserved an asset for all to enjoy in the future," said Craig.



Former Quarries Restored

Rehabilitation of quarries and other extraction sites continues to be a key issue in the aggregates industry. The extraction of raw materials inevitably impacts on the surrounding natural and social environment. In particular, the removal of soil and changes in topography of the area are likely to affect local ecosystems and watersheds. These impacts can however be successfully addressed and mitigated through the development and implementation of an effective quarry rehabilitation plan.

Te Puna Quarry in Tauranga



The Te Puna Quarry in Tauranga started its service to the region in 1911 when 32 hectares was reserved for quarry purposes. The rock was used for road works, reclamation and breakwaters. For a long period the county council operated a small crushing plant at the site to provide for the

local needs which included the old Tauranga-Waihi highway. While at first the quarry was worked by the county council but, this was phased out in favour of private contractors who paid royalties on quantities produced for sale, with the council having prior right of being supplied.

After World War Two, from 1945 onwards, output from the quarry increased and supplied crushed metal for county roads and for the reconstruction of state highway two. Large quantities of stone were also used for bridge approach embankments in the general area of Tauranga, for the Strand reclamation, for breakwaters built on the foreshore and for farm tracks.

While quarry operations ceased in 1979, over its fifty year service some 575,000 tons of rock was removed to develop the local area. Now the site that served the region has a new role as the Te Puna Quarry Park. It is being developed by a dedicated band of volunteers into a world-class park that has already become a place of special beauty.

From the upper levels there is a spectacular panoramic view out over the Bay of Plenty. There are ponds, tree ferns, cymbidium orchids by the thousand, native tree plantings and exotics such as vireya rhododendrons - a wild garden of infinite variety. It also has a butterfly garden where monarchs and admirals happily fly free.

Featured throughout the park are sculptures by local artists. The former quarry is now becoming popular as an exhibition area for outdoor art and also for weddings. The walking tracks are easy for the moderately fit. This is a place to enjoy, a place of nature and tranquility, of stunning views and great art. See www.quarrypark.org.nz for more.

Eden Garden

Eden Garden in Epsom, Auckland, started its life as a quarry in 1909 and closed in 1916. In 1964 horticulturalist, Jack Clark, with 15 fellow enthusiasts took on the challenge of converting the old quarry into the world-class garden it is today.

The quarry, on the site of one of Auckland's forty volcanic cones, had supplied stone for the early development of the city. It had been purchased by a city businessman, Sir Frank Mappin, as an addition to his neighbouring estate, which he



eventually donated to the Crown as the site for Government House. The quarry site was not required and it passed to The Eden Garden Society for development.

See www.edengarden.co.nz for more.

Mt Smart



Mt Smart Stadium is sited on a 22-hectare Auckland Regional Park owned by the City of Auckland. It was originally a volcanic hill that stood some 86 metres high. The site was acquired by the Crown in mid-1800s to serve as a quarry for road and rail construction. Over the following 100 years the cone of the volcano was quarried away, leaving the present day amphitheatre where the stadium is sited.

In 1942 the Mt Smart Domain Board was created and charged with turning the former quarry site into a public recreational reserve. By 1953 a plan had been approved for a stadium and early formation work was completed in 1965.

Whangarei Quarry Gardens



The Whangarei Quarry Gardens project, to convert the disused Hardie Bros quarry into a public gardens, began in May 1997 and in January 2013, some 15 years later, the gardens were assessed as a “Garden of Significance” by the NZ Gardens Trust.

It is an extraordinary transformation, and

an excellent use of a worked-out quarry. Credit for the first suggestion to turn the old quarry into a scenic reserve, must be given to the late Howard Mullenger, who in 1976 was the Northland area manager for Winstone Aggregates: he would be pleased to see his vision realised today.

Whangarei Quarry Gardens is governed by a charitable trust and is operated as a community project. Dedicated volunteers and garden clubs undertake almost all the work on regular weekly working days facilitated by the professional garden manager.

See www.whangareigardens.org.nz for more.

Waitakaruru Arboretum & Sculpture Park



Carved into a Waikato hillside, The Sculpture Park at Waitakaruru Arboretum is a former Winstone Aggregate greywacke quarry that has been transformed into a magnificent 17.5 hectare garden and arboretum. The

owners, John and Dorothy Wakeling, initiated the project that has been in the process of development since 1991 and currently maintain it with some part-time assistance.

The Wakelings were looking for land and “the quarry had its own charm - it was a relic, a piece of industrial history that had supplied the Waikato with gravel for about thirty years. The quarry workings had left behind a place with a strange, skeletal beauty that could only come of human activity on a large scale.

The 30m sheer cliffs, the steep, rock-strewn slopes and the sweeping curves of the quarry roads all tied into a framework where form followed function”.

The 17.5 ha (42 acre) hillside site provides panoramic views over the fertile Waikato valley. The site contains intimate tree-enclosed spaces and interesting landforms including towering cliffs, rocks, a stream, many ponds, and small waterfalls. More than 20,000 trees and shrubs have been planted, representative of flora from many parts of the world.

Visitors can enjoy 60 to 80 sculptures and installations within New Zealand's biggest outdoor gallery along the 2 km long nature trail. Dramatic changes in light and foliage, wildlife, and vistas guarantee a breathtaking experience. The quarry cliffs and pond provide the visual and acoustic setting for musical performances. See www.sculpturepark.co.nz for more.

The Isaac Conservation and Wildlife Trust

Sir Neil and Lady Isaac acquired a homestead and 5ha of land at Harewood. They began quarrying in 1957 for the formation of Memorial Avenue and further voids were created as other projects required additional shingle from the site. Looking to the spaces left in the landscape, Sir Neil and Lady Isaac would be inspired to provide something back to the land. This resulted in the formation of what would be the first of many conservation waterways - Lake Diana.



The rehabilitated area was named Peacock Springs, and within it the beginnings of a sustainable and expansive habitat for flora and fauna was established.

In 1977 The Isaac Wildlife Trust was formed to ensure the continuity of their work. In 2009 the Isaac Conservation and Wildlife Trust was established. Since its simple beginning in 1957 the conservation land has expanded to cover some 1100ha, including an expanded quarry operation, salmon farm and general grazing and farmland.

As a quarry reclamation project the landscape is internationally recognised as the best of its kind. Thanks to the generosity of the Isaacs the conservation of this environment will continue in perpetuity. See www.isaacconservation.org.nz for more.

Halswell Quarry Park

Halswell Quarry, which played a major role in the development of Christchurch, ceased production in 1990 after 140 years of quarrying. Its fine blue-grey stone can be seen in many of the city's prominent buildings including the Canterbury Museum and Provincial Council Buildings.



The Christchurch City Council decided to restore the quarry as a passive recreation reserve, wildlife habitat and an educational resource. The strikingly sculptural and geologically interesting rock faces of the quarry were retained. A huge planting programme was undertaken with over 250,000 trees and shrubs planted.

Halswell Quarry is now a unique 60.4 hectare park, with an unusual combination of recreational walks, historic sites and botanical collections.

Important historic buildings from the quarrymen's days are being preserved and the once noisy rock face is now a quiet amphitheatre facing onto a parkland of short walks and wetland ponds.

The buildings that can be seen in the park were all part of the working quarry. The workshops built in 1912 housed a newer, bigger crushing plant. The single men's house (now a visitor centre) was built in 1921 to replace the wooden one that was destroyed by fire in 1920. Paterson House above the main entrance was built in 1927 for the then manager, Mr Ned Paterson and also as a show home to demonstrate how the quarry stone could be utilised.