

## Quarries in Hong Kong

**Key Messages:** Hong Kong has a long history of rock quarries, which predates the British administration in 1841. They have played an important role in the development of Hong Kong and remain strategically important to the construction industry in that they provide rock resources, principally aggregates, the capacity to recycle surplus rock generated from construction projects and sites for concrete and asphalt batching plants. Upon completion, the quarry sites provide a source of land suitable for development. Currently, there is only one active local quarry, Lam Tei Quarry. Studies are underway to assess the feasibility of developing new surface and underground quarries.

### A Brief History

The quarrying of stone, principally granite, in Hong Kong predates the start of the British administration in 1841. Subsequently, with the development of the City of Victoria on Hong Kong Island and the need for rock for buildings and roads, the government began regulating the local quarry industry under a permit system, the first of which was granted in 1844. By 1907, there was 114 permit quarries: 5 on Hong Kong Island, 8 on the Kowloon Peninsula and 101 in the New Territories. The District Officer issued permits for the New Territories and the Superintendent of Crown Lands for Kowloon and Hong Kong Island. The Government first established its own quarry at Tsat Tsz Mui in 1915.

Until the 1950s, most of the rock produced locally came from small-scale permit quarries, but the output from these quarries was typically limited to a few hundred tonnes of aggregate per day (a modern quarry can produce a few thousand tonnes of aggregate per day). The operators of the permit quarries originally paid the Government for the rights to quarry based on the amount of rock excavated, but because of difficulties in obtaining reliable production records, the Government subsequently introduced a scheme whereby fees were paid based on the actual length of the production face. A problem with these small quarries was that operators had a low awareness of health, safety and environmental matters. In an attempt to address these issues and to increase the production of quarries, the Government began to introduce 'contract' quarries, where the operator paid the Government a premium, based on a lump sum tender price, every 6 months for the rights to excavate and sell rock.

In spite of the establishment of a few larger contract quarries, due to the continued prevalence of small permit quarries, the quarry industry had difficulty in coping during periods

of high demand, such as the building boom between 1963 and 1964. The shortage of aggregate, mainly for the production of concrete, during this period led to a significant increase in the price. The sharp drop in the demand for aggregate that occurred following this building boom also had an impact on the number of operating permit quarries, with only 37 out of 70 quarries with permits remaining in operation during a survey in 1966.

To secure a stable supply of aggregate to meet the anticipated demand from the construction of housing and the establishment of 'new towns', the Government reviewed the quarry policy in 1966 and embarked on a programme to phase out the award of new permits for quarry sites and replace them with contracts through open tender. In 1974, the last permit quarry, Flat Hill Quarry (Jordan Valley), closed. At that time, there were six contract quarries (Cha Kwo Ling, three at Anderson Road, Lam Tei and Shek O) and two Government quarries (Diamond Hill and Mount Butler). Notwithstanding the move to contracts, a problem remained: there was no requirement for the quarry operator to rehabilitate the quarry site and consequently this led to a legacy of dangerous and degraded ex-quarry sites, many close to urban areas and, without extensive work, the sites were not suitable for development. The Government addressed this problem by introducing rehabilitation contracts.

### **Rehabilitation Contracts**

In 1989, as an outcome of the Metroplan Landscape Strategy for Urban Fringe and Coastal Areas, quarries were identified as areas of degraded landscape requiring rehabilitation. To deal with this issue and to provide suitable, safe sites for development, the Government introduced quarry rehabilitation contracts. Under such contracts, the quarry contractor is required to pay the Government for the rights enjoyed under the contract, such as processing and selling of rock excavated within the quarry, and manufacturing and selling of concrete and asphalt products. These rights generate income for the contractor, which is used, in part, to cover the cost of rehabilitating the quarry site. The rehabilitation typically involves major landscaping work, habitat restoration by planting of trees and shrubs, and drainage and erosion control measures.

The following quarries have been operated under rehabilitation contracts:

- Turret Hill Quarry – The quarry site is located to the northeast of Shatin New Town and occupies an area of 25 hectares. It was established in the mid 1960s and a rehabilitation contract was signed in April 1989 and completed in June 1995. About 8.5 million tonnes of rock were excavated from the quarry under this contract. A portion of the site is currently occupied by the Environmental Protection Department as a refuse transfer station and part, which was used by the Construction Industry Council Training Academy, will be re-developed into a public columbarium.

- Lamma Quarry – The quarry site is located on the north side of Sok Kwu Wan and occupies an area of 49 hectares, with about 1 km of coastline. The rehabilitation contract was signed in December 1995 and was completed in December 2002. The total amount of rock excavated from the quarry was 14.7 million tonnes. The rehabilitation work included construction of a 4 hectare lake.
- Shek O Quarry – The quarry site is located on the west coast of Cape D’Aguilar Peninsula on Hong Kong Island and occupies an area of 45 hectares. The rehabilitation contract was signed in March 1994 and completed in January 2011. The total amount of rock excavated from the quarry was about 26.6 million tonnes. The rehabilitation work included the construction of a marine cove for recreation purposes. Subsequent to completion of the quarry contract, the site has principally been used for the construction of sub-sea concrete tunnel sections.
- Anderson Road Quarry – The quarry site is located on the south-western ridge of Tai Sheung Tok on the Kowloon Peninsula and the platform created by quarrying is 40 hectares. The rehabilitation contract was signed in March 1997 and was originally scheduled to be completed in December 2013, but subsequently extended to mid 2017. The total amount of rock excavated from the quarry was about 43 million tonnes. The site is currently being developed for housing.
- Lam Tei Quarry – The quarry site is located about 3 km north of Tuen Mun New Town and the platform created by quarrying is anticipated to be 9 hectares. It has been operating as a quarry since 1982. The first rehabilitation contract commenced in October 2006 and was completed in July 2015. During this period, about 6 million tonnes of rock was excavated from the quarry. With the scheduled closure of Anderson Road Quarry in 2013 and the strategic need to maintain a local quarry, a further rehabilitation contract was signed in March 2015 and is scheduled to be completed in 2023. Under this contract, a further 5 million tonnes of rock will be excavated. Lam Tei is currently the only active local quarry.

### **Importance of Quarries**

Quarries are of strategic importance to the local construction industry in that they provide:

- (a) rock resources that help maintain the stability of local supply by avoiding over reliance on import from the Mainland and resilience against the risk of import disruption;
- (b) capacity to recycle surplus rock generated from local construction projects, thus helping to ensure reuse of local resources;

- (c) much-needed sites to house essential construction-related upstream facilities, such as concrete and asphalt batching plants; and
- (d) upon completion, a source of land suitable for development.

### **Supply and Demand**

Hong Kong was self-sufficient in the production of aggregate and other rock products from local quarries until the late 1970s, when local demand was about 10 million tonnes per year. With continued local development, demand increased and peaked at about 25 million tonnes per year in 1995-6 due to the Airport Core Programme. In parallel, local production declined with the progressive closure of local quarries, and Hong Kong increasingly became dependent on import from the Mainland. Demand again increased in 2010-11 with the construction of the 10 Major Infrastructure Projects and peaked again at about 25 million tonnes per year in 2017 with the start of the Three Runway System Project. Currently (in 2019), demand is about 17 million tonnes per year and is forecast to gradually increase in demand linked to population growth. Lam Tei Quarry, the only quarry currently in operation, produces about 1 million tonnes of aggregate per year, which is about 4-7% of current demand. This shortage in local supply of aggregate may have implications for the sustainability to the local construction material supply industry, as well as the cost of future development.

The recycling of surplus rock in quarries generated from local construction sites is also used to produce aggregate and other rock products. This activity makes an important contribution to ensuring the sustainable use of Hong Kong's natural resources. It also helps relieve the pressure on public fill reception facilities and provides an additional source of revenue for the Government in terms of a royalty paid by the quarry contractor. In the past 5 years, the total quantity of rock imported to Anderson Road Quarry and Lam Tei Quarry for recycling was about 1.5 million tonnes.

### **Future of local quarries**

The current quarry contract at Lam Tei is scheduled to be completed in 2023, and future land use planning for the site is being studied. The Government, recognising the strategic need for a new quarry to dovetail with the closure of Lam Tei, is in the process of undertaking feasibility studies on potential new surface quarry sites. In addition, as a new initiative for Hong Kong, studies are being undertaken to assess the feasibility of developing underground quarrying-cum-cavern development.